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The Builder

AN

ILLUSTRATED WEEKLY MAGAZINE,

FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR, SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

GEORGE GODWIN, F.R.S., F.S.A.

"Every man's proper mansion-house, and home, being the theater of his hospitality, the seate of selfe-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kinde of private princedome, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned."

"Architecture can want no commendation, where there are noble men, or noble mindes."—Sir Henry Wotton.

"Our English word To Build is the Anglo-Saxon Býlðan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—Diversions of Purley.

"Art shows us man as he can by no other means be made known. Art gives us 'nobler loves and nobler cares,'—furnishing objects by the contemplation of which we are taught and exalted,—and so are ultimately led to seek beauty in its highest form, which is Goodness."

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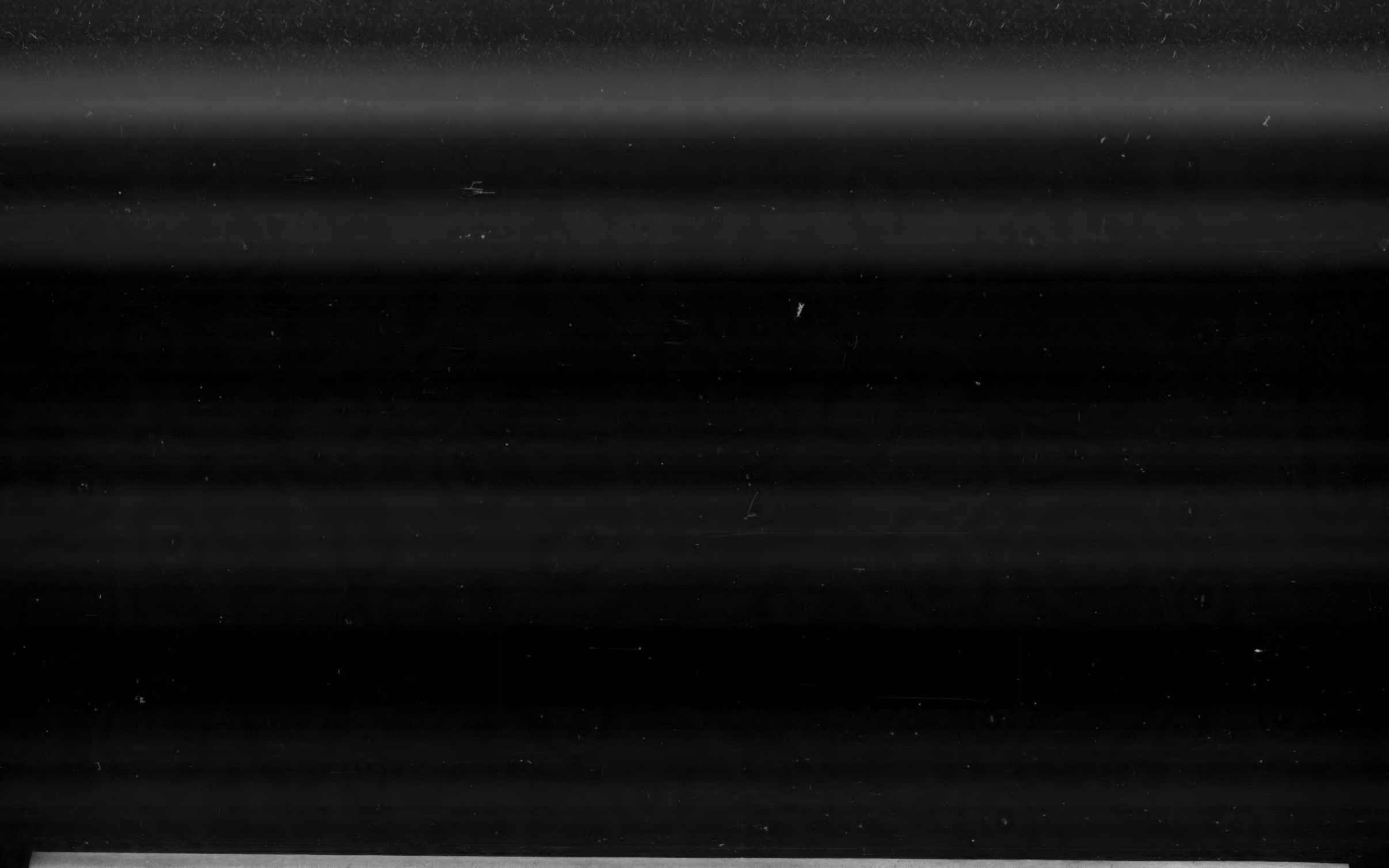

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The BUILDER

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Modern Athens.

A monogram on our left contains the initial letters of the words "Theophilus Hansen"; it also represents with sufficient accuracy the block-plan of the Academy of Athens. Is it necessary to add that Mr. Hansen is the architect in whose name the Academy has been designed and built? Old John Thorpe *confessed*, in the three elegant lines,—

> "These 2 letters | and T,
> ioyned together as you see,
> Is ment a dwelling-howse to bee,"—

to having constructed a plan on the automonogrammatic principle; but his present disciple pleads that he was not a voluntary agent in the bringing about of this happy coincidence.

Leaving, however, all speculation as to unconscious volition and the like, we must turn our attention to bricks and mortar, or rather to marble and cement; and in the first place it is necessary to state the uses for which the Academy of Athens is intended.

Its appellation cannot be termed distinctive. It raises in the mind a succession of dissimilar ideas, which may be divided into three classes, having for their types the Royal Academy of London, the Academy for Young Gentlemen, and the Academy of Paris, respectively; to either of which its application is ridiculous. But however absurd it may be for "Europeans" (as the Greeks call Western nations, as distinguished from themselves) to term a building situated in the centre of a crowded metropolis, "Far-from-the-people," it is more so to do it here, where the meaning and derivation of the name are contained in the Vulgate, and can never be overlooked. The Academy of Athens is to be such as those of Paris and Berlin, the head-quarters of the literary and scientific bodies of the nation, and as the statutes have not yet been drawn up, we may hope that, when the task is undertaken, the Greeks will find in their copious language a word more suited to express the purpose of the place, and so save themselves from the perpetration of a philological outrage, and give to Europe a word much needed.

We have said that the Academy was designed and built "in the name" of Mr. Hansen, and we think the phrase a good one to express the relationship in which some architects stand to the buildings which they are popularly said to "erect"; but we do not wish to impugn the ability and learning of the State-architect of Austria; his official position speaks for itself; his reputation is more than national; the Parliament-houses at Vienna will preserve his name to posterity as an eminent professor of our art. An outline history of the undertaking will explain our meaning.

Seventeen years ago Baron Simon von Sina, at that time ambassador to Austria, Prussia, and Bavaria, a patriotic Greek who has not once visited his native country, commissioned Mr. Hansen to prepare designs for an academy, which he proposed to present to his nation. Mr. Hansen, who had formerly studied in Athens, and had held the professorship of architecture, returned *con amore* to the fountain-head of art, and the drawings were soon in train at the office in Vienna. Mr. Ziller, the present professor of architecture under the Greek Government, was at that time in Mr. Hansen's office, and, without re-opening the wounds inflicted in the Barry and Pugin, and more recent Ross and Roper, controversies, we would suggest that the assistance of one who had already gained much distinction in the profession must have materially affected the nature of the design. In 1861 Mr. Ziller arrived in Athens, as the representative of Mr. Hansen, who had done little more than to lay the foundations of the structure, and since that date the former gentleman has conducted the operations. But over and above any facts in the history of the building which render it probable that the design, as executed, owes its character rather to the mind of Professor Ziller than to that of Professor Hansen, there is internal evidence sufficient to produce a moral certainty that it has been carried out under other influence than that of the architect who originally conceived the forms, and made the disposition of the masses. The University and the Academy stand side by side, and even to the casual observer there appears a greater difference of treatment than the more ample funds which have been applied to the construction of the latter will account for; while to the critic their individualities (for, happily, they each possess an individuality) stand out in strong contrast. The general effect of the University approaches the archaic; that of the Academy certainly does not.

With regard to the cost of the works, the fluctuations of professional opinion have been considerable. Mr. Hansen at first stated the probable expense at one million francs (40,000*l.* sterling); he subsequently saw reason to conclude that it would cost four times that amount; and now, in accordance with the wish of the donor, it will be completed for somewhat less than 2,500,000 francs (100,000*l.* sterling).

The University and the Academy stand side by side, and, when the Library is erected, the three buildings will form a group interesting as a study of modern Greek architecture, and even more, as a monument of Greek liberality. The site of the Academy is infelicitous, in that the building cannot be seen to advantage from any point beyond the road which passes before it, and is entirely hidden from the Acropolis.

We will now consider the architecture of the fabric with some minuteness.

If the reader refer to the monogram at the head of the first column, few words will suffice to explain the general arrangement of the building. The principal elevation is on that side of the plan which is nearer to the bottom of the page, and it presents a portico having on either side a wing projected before it, and connected with the central portion by a transverse block. The second elevation is arranged in a similar manner; but there the portico is projected before the wings, instead of being recessed as in the former case, and courts are formed between the lateral and central blocks by means of walls connecting them. The plan of the building is contained in a parallelogram 216 ft. long by 166 ft. deep.

Internally the structure consists of ground-floor and a basement. On the ground-floor, that part of the leg of the T which is crossed by the horizontal stroke of the H is occupied by the entrance-hall; the rest of the leg of the T by the theatre, which is 66 ft. by 40 ft. Each

of the connecting portions contains a corridor 11 ft. wide, offices, and a spiral staircase to the basement. The lateral portion on the right-hand side contains the library; that on the left, three spacious rooms for the librarian, and three more for the offices of the Academy. In the basement, which has its own external entrances, are printing-offices, rooms for the servants, and domestic offices.

The whole pile is boldly raised upon a basement-story of Pirœic limestone, 17 ft. high from the ground level. The stone is of a brown colour, and of an uneven texture, well suited to its inferior position, and forming a good contrast with the Pentelic marble of the upper story. We think, however, that a rough material should receive a rough treatment; and we venture to suggest that, if, instead of being worked to an even surface, and laid with grooved joints, it had been rusticated with delicacy, and "studied negligence," it would have been even better than it is.

The basement-story has a square unmoulded plinth, which projects some 8 in., and on its uppermost course lie two marble steps, from which rise the wall and pilasters of the upper story, being set back about 2 ft. from the face of the basement. We consider this arrangement most excellent. If columns require a stylobate when they are at the ground level, have we any reason to suppose that they do not when they rest upon a lower story? But more than this: the treatment which we find here entirely obviates the over-hanging effect, which, however it is to be explained, is so generally seen when an "order" is introduced in an upper story, or when "order" is used above "order." Even in Somerset House and Whitehall Palace, as one looks up, the semi-columns seem to be clinging to the walls for very life.

It would have rendered the cost of the building too enormous to have constructed it of the best quality of marble, and, consequently, we find the surface covered with veins. This would have been, in itself, a small evil, if an evil at all; but, unfortunately, it is not necessary, owing to the homogeneous texture of the material, and it is not customary, we know not why, to work the marble with any consideration of its bed. The result is that the face of the work is streaked with zigzag lines irritant to the feelings of one who has been accustomed to see stone laid as it was laid by nature. But time will mitigate this effect by giving to the surface that matchless hue of buff, which makes the buildings of Greece "beautiful for ever."

A glance at the block plan will tell any professional architect in what manner the building is roofed; but, lest there should be any doubt about this most explanatory feature, we will say that the central block has a pediment at each extremity, that each lateral block has four pediments, one on either side of each extremity, and that these together make up the number of ten pediments in all, each several pair of which are duly connected by ridge and eaves. The roofs of the transverse blocks intersect those of the lateral, and abut on the central block, which rises with monumental effect considerably above the other parts.

The Greek Ionic order is employed throughout the design with a most happy result. The central block is amphiprostyle. The principal portico, which is prostyle, hexastyle, tetrastyle in antis, has columns 30 ft. in height, of the kind which has those of the Temple of Minerva Polias for its prototype, that is to say once more, they have the astragal below the volute, and the honeysuckle ornament (palmates) round the neck. Indeed, the form of these columns is undisguisedly taken from that venerable example. The second portico, which is prostyle, hexastyle, has similar columns, and both have, at the inner corner of their angle abaci, that horrible joining together, and mutual destruction of volutes, which is sanctioned by the precedent of antiquity.

We could not understand why, since the mouldings of the *antæ* resemble those on the Acropolis, the palmates, which there form a link between the columns and the *antæ*, should be omitted; nor why, since the astragal and mouldings of the *antæ* are carried along the walls, the base mouldings should not be also. The fact that they were not in the Minerva Polias can be accounted for by the circumstance that they would have appeared disadvantageously in relation to the Erechtheum, which stands upon a much lower level; but here in the Academy, without any apparent cause, we have in one part the base mouldings carried round and the mouldings of the capitals stopped, and, in another part, the base mouldings stopped and the mouldings of the capitals carried round. We have since learned that both these appearances are due to a collision which took place between economics and architecture, in which the latter was borne down by its grim opponent; and we have also been informed that when the decorations are executed, polychromic "honeysuckle" will ameliorate the present effect of the *antæ*.

Beneath each of the minor pediments is a large window, divided into three lights by Ionic columns, of the Temple-on-the-Ilissus form, with their attendant semi-columns. We cannot appreciate the introduction of a flower into the band between the fillets of the volute, a practice which was resorted to by the ancient Greeks only, we believe, when the fillet became unusually broad, as in the temple at Basse; otherwise, as here, the plain surface is needed to refresh the eye.

The tympana of all the ten pediments are adorned with statuary; that of the two principal is executed in marble, that of the rest in a beautiful terra-cotta, in accordance with the usage of the ancients, as mentioned by Pausanias. The pure whiteness of the material is obtained by adding to the clay a small proportion of the chalk from which Crete derived its name. The workmanship of the statues is considerably above the average, and their celestial majesties do not appear more than usually incommoded by the pitch of the roof. We confess that the principal group fills the mind with anxiety for the father of the gods, for Hephæstus appears to be on the point of "giving him one" with his hammer, while Hera, sufficiently in accordance with nature, looks on with divine indifference.

The walls of the building consist of a series of pilasters, with windows or walling between them. Between the windows, which are grouped in two, three, and five lights, and where windows might (not *should*) have been, the wall is recessed; so that at the angles of the different blocks only does it retain its full thickness. The whole is arranged in strict, but graceful symmetry.

The variety of capital which is made use of in this instance is well known, and a few words will recall it to mind. Each volute, instead of running horizontally from the centre of the capital and curling downwards, rises from the astragal, and passing up the *angle* of the square capital, curls outwards beneath the abacus. On each of the exposed, or partially exposed, faces are caulicoli, palmates, and tendrils.

Such is the capital of the pilasters, and against it we will commence, in forensic manner, our charges by investigating its reputation. Firstly, then, no such capital is found in the Acropolis of Athens, and of art; and we must go for our type of the class to which it belongs to the temple of Minerva at Priene and to that of Apollo at Miletus, two examples, we need not say, of the Asiatic division of the Ionic order. Now, seeing that every other part of the design is of the Attic division, we think that necessity alone should have been able to procure the introduction of this alien feature. Secondly, to our mind and eye the excellence of both the above-named temples is of a lower order than that of the Periclean works. And, thirdly, making allowance for the fact that the Asiatic architecture of the Greeks was both in its maturing and its decay in advance of the European, we consider that these buildings are by no means of the best period. But, after all, it is not so much the design of the capital which offends the sense, as the marring which it must necessarily undergo, when applied to a pilaster. In that case one of two courses is open to the architect, namely, either to stop the mouldings and foliage of the lateral faces against the wall, or to return them along the wall. The latter of these is the better, and such a mode of treatment would have been adopted in the Academy, had the sum at the disposal of the architect been sufficiently large; but it was not, and consequently we gaze with shuddering pity on a mutilated form.

We have it on Dryden's authority that "Pity moves the mind to love," but in the instance under consideration we own that it has failed to do so. We do not like that which raises in the mind ideas of incompleteness and obstruction. We must suppose either that a capital has been wrought and that the wall has been so built against it as to hide one side entirely, and half (!) of two more; or else that half a design has been wrought and attached to the wall. One volute of each lateral face is visible, and well may it cry, in the words of another great English poet, "Where is my brother gone?" while the severed palmate must pine indeed for its "other half." How much more worthy of the rest of the design it would have been if, consigning the "wood-hut" type "to its own place," the simple and most unexceptional moulded capital which is found elsewhere in this same structure had been employed, and had been returned along the walls in the same manner as the base mouldings are. The pilasters would then have become buttresses, parts of the wall, tied to it by the mouldings; and surely there is no reason why the Classic style should not borrow from the Gothic principles that are good and true.

The roofs are covered with tiles of the shape most usually employed by the ancients. *Antefixæ* are placed before the end of each alternate row, an arrangement scarcely in accordance even with that small amount of logic which usually bounds the flight of genius; for if an *antefixa* is necessary to one row of tiles, it must be necessary to every other, and, consequently, by employing it before only one-half of the eave-tiles, the voluntary deception of the senses produced by possible utility is entirely destroyed. The *antefixæ*, which are missing from the eaves, are seen on the ridge,—a less suitable position; yet the roofs look well enough.

On the present occasion, we will notice only one part of the internal construction, namely, the roofs or ceilings, which cover the apartments. A description of that of the theatre will render it unnecessary to describe any of the others. That which Mr. Ruskin calls the "true roof," or "roof proper," and what more ordinary people call the ceiling, does not exist; the form of the room following the pitch of the roof, which is framed in many small coffers, moulded in gypsum. The principal rafters and purlins are strongly marked, and if our description ended here, it might be supposed that it was a most constructional piece of work. But we are sorry to have to record that in the whole length of 66 ft., not a tie-beam, not an indication of any tie of any kind is seen; and as for the ridge-piece, it is literally cut away to allow a weak angle to form the internal apex of the roof. This may be a fine display of engineering skill, but, oh, ye Gods of Greece! is it architecture?

How often is the objector told that the peculiarity which offends his eye or his common-sense is a feature of the building. "Indeed," we once heard a venerable amateur reply, "it is a feature, and so is a nose ridiculously elongated, or an ear of abnormal development." We have now come to the feature, or features, of the Academy. Two huge columns rise one on either side of the main portico, within the line of the wings, some 40 ft. in height above the level of the upper floor, they overtop the highest apex of the pile, the lower parts of which stand around them like pigmies round the feet of a giant. Though intrinsically admirable, these pillars produce a pernicious effect upon the rest of the building, of which all who see them have ocular demonstration, for, as we have remarked twice already, the Academy and the University stand side by side. If a man who had passed before the two buildings were stopped in the Place de la Constitution and were asked to express his idea of the relative heights of the columns of the University and of the Academy, he would probably say roughly that the former are twice as high as the latter; now, the fact is that the difference is altogether insignificant.

On the summit of these lofty columns are to be stationed statues of heroic size, representing Minerva and Apollo, the tutelar saints who divide with the Madonna and St. George the reverence of the devotional Athenians. All have heard, and doubted, the story of the sailor, who, on arriving at Trafalgar-square, inquired why Nelson was sent to the mast-head; and with feelings similar to his, we asked why the divinities should occupy so giddy a height. "Is not," responded the learned professor, "the dwelling of the deities in the clouds?" "Yes, yes!" broke in a modest voice, "the gods of art walk no longer among men."

The building is to be finished with polychromic decorations, in which gold will predominate. As much as is done promises well, but as yet the work is too incomplete to allow us to pass a judgment upon it, although the bolster blows of amateur criticism already fall thick; but, then, every man in Athens, including women and children, is a universal critic. When the whole is finished, we hope that we may resume the description, and notice those points which we must for the present omit.

To Professor Ziller, the architect of the Academy, every civilised man is indebted for the excavations of the Panathenaic stadium, and his spirited defence of the principles propounded by Mr. Penrose give him an additional claim upon the English members of his profession. We are sorry not to find his name in the list of members of the R.I.B.A.

We have heard in Athens a lady begin by describing her friend as a most excellent person, and end by leaving her without a shred of character, a presentable feature, or an amiable quality. We will reverse this order. Having now encompassed the building seven times, and having tried every joint of the armour with which merit has protected it, we will, in the manner of Demetrius Poliorcetes, present to the place we have attacked the engines of the siege,—that is to say, our humble judgment, and the testimony of our experience. In conclusion, then, we pronounce the Academy of Athens a most excellent structure, honourable to all who have been connected with it.

SOME RESULTS OF THE PAST YEAR.

THE year 1875 has been, from the point of view most appropriate to our pages, a year of seed-time rather than of harvest. Not that, by any means, there has been so full a broadcast committed to the soil as was hoped for, and even promised, at the beginning of the year. Still, as to much of the good fruit of the future we, and those who come after us, may have to look back, with some gratitude, to the year that closed the third quarter of the nineteenth century.

Measures for facilitating the transfer of land, for improving the dwellings of the working-classes, for regulating some of the laws relating to labour, for consolidating the Acts of Parliament relative to the public health, for preventing the pollution of rivers, and for amending the law as to loans for public works, were proposed early in the session. As to the details and policy of these measures we have taken occasion to comment from time to time. The Act passed for facilitating the improvement of the dwellings of the working-classes in large towns, which is supplemented by a similar measure for Scotland, is now in course of operation; and the incoming year will probably enable us to form some just opinion of its practical efficacy. The great library of statutes affecting the question of public health has been reduced to the dimensions of a single Act, a necessary simplification with regard to further legislation. The Rivers Pollution Bill was unfortunately postponed. Measures were passed with a view of preventing danger to populous neighbourhoods by the careless carriage of explosive substances, as to which the accident in the Regent's Canal read us so serious a lesson, and as to which the close of 1875 has witnessed a terrible instance of the action of explosive materials abroad. Legislation also has been effected as to the adulteration of food, as to the law of conspiracy, as to the titles to land, and as to the inspection of unseaworthy ships,—a matter in which the energy of an individual member of Parliament has had an unusually effective influence on the proceedings of the Legislature.

The Act of Parliament for the erection of a Bishopric of St. Alban's has given to the largest ecclesiastical building in England, and, with the exception of St. Peter's, in Europe, the rank of a cathedral. The appeal which has been made to the public to facilitate the complete restoration of this noble abbey, named after the proto-martyr of England, will, we trust, be successful. The restorations already effected are of unusual interest.

In science, one of the most notable features of the year was the assembling of the British Association under the presidency of a civil engineer. The outcome of the meeting, however, was not of so memorable a nature as on some previous occasions. We hope that the propriety of giving, in the opening speech of the president for 1876, something by way of programme of the matters which have been found worthy to be brought before the several sections will not be lost sight of. The tendency of the time is towards the overlaying the scientific character of these and similar gatherings, by the social element,—of postponing work to amusement. The absence of a proper general programme tends to intensify this mischievous influence. Men who attend, not for the sake of fun, but for that of work, will be far more likely to be attracted by a business-like statement of the projected discussions, than by a list of excursions proposed, charming as these sometimes are. Thus, too, we should be more likely to avoid the misfortune of the occupation of the time of the visitors by the introduction of matters so irrelevant to science as were some of those brought before the sections at the last meeting.

The result of the perforation of the Wealden beds in Sussex has been such as to bear out the views we have so definitively expressed as to the slight grounds on which the optimist expectations of the Report of the Commission on Coal were based. The export of this precious mineral continues to increase, the tonnage of 1874 being 13,380,000 tons against 12,077,000 in 1873. The prices have ranged widely, but rule high, from 5s. for slack to 33s. for best. The export of iron has declined by 470,000 tons, or nearly one-sixth of the total of the previous year. The results of the disastrous struggle in South Wales at the commencement of the year will not be fully brought to light until the statistics of 1875 are made up.

The total receipts on the railways of the United Kingdom have reached a higher figure than in any previous year, amounting to 56·9 millions sterling. But the working expenses have advanced with more rapid strides, so that the net receipts of 1874 are less by 316,000*l.* than those of 1872. The working cost has consumed more than 57 per cent. of the entire income. In 1854, the earliest year for which we have the materials for comparison, the proportion of working expenses to gross income was 45½ per cent. The steady increase in the proportionate cost of working, which was chequered by a slight decline in 1871, when it fell from 49 to 48·4 per cent., has advanced with rapid strides since that date. The ratio for 1872 was 50 per cent.; for 1873, 54 per cent.; for 1874, 57 per cent. At the same time the cost per mile is also advancing, that for 1858 being 34,000*l.*, and that for 1873 being 36,500*l.* over the whole mileage. There is no doubt that the steady increase in the price of coal and labour increases working expenses. The increase of the capital account, however, is not thus accounted for. Again, it must be remembered that since 1853 the gross earning per open mile of railway has increased by 37 per cent., or from 2,516*l.* to 3,459*l.*; the rate of increase for 1874 being 3*l.* per mile less than that for 1873. There thus seems to be leakage at almost every joint, and it becomes highly expedient that railway proprietors should make some inquiry as to the true results of that mineral traffic which, carried on at such low rates, requires so large a portion of their plant, and so fully occupies their lines of way.

In face of such a movement in railway cost, we must regard the scientific, rather than the economical, results of the attempt to tunnel the Channel, as a matter likely to be of interest. Legislative sanction has been obtained for this scheme, as to the feasibility of which there is considerable difference of opinion among geologists; the possibility of its execution being admitted to depend on the continuity of the lower chalk-bed under the Channel. In the meantime, the success of the *Castalia* in producing freedom from sea-sickness, although the speed attained has not yet proved satisfactory, is enough to show that the sub-aqueous route, if ever made, will be far from monopolising the traffic across the Channel.

The bold step taken by Her Majesty's Ministers in the purchase of the Khedive's interest in the Suez Canal appears to have given general satisfaction. For the first time in modern history a great engineering operation has been regarded in its true light as a matter of European importance. That a considerable amount of engineering work will be entailed for the defence and improvement of our new property may be reasonably anticipated, and the real value of the purchase has yet to be seen.

The greatest mechanical triumph of the year has been the partial completion, and proof, of a piece of ordnance of the enormous weight of eighty-one tons, and throwing a projectile of 1,465 lb., or nearly two-thirds of a ton. The powder was formed in cubes, of from 1·5 in. to 2 in. on the side, and the charges varied from 220 lb. to 250 lb. The internal pressure on the breach of the gun amounted, in one case, to 28·1 tons per square inch. The highest muzzle velocity attained was 1,551 ft. per second. The cost of each discharge, in time of war, is estimated by his Royal Highness the Commander-in-Chief at 25*l.* Enormous as is the destructive energy thus produced, yet more powerful ordnance is contemplated. We think it does not need any prophetic instinct to arrive at the conclusion that armoured ships will be so definitively beaten by projectile power, that the development of our naval force must be sought under some very different type than that of the iron-clad, to say nothing of the iron muffin-plate of Admiral Popoff.

The architect has been furnished, during 1875, with samples of what is practically a new material, and one of which the introduction is likely to be attended with great structural, as well as domestic, utility. This is the annealed glass of M. de la Bastie, which, without loss of brilliancy or of transparency, or objectionable increase in weight, has the strength of cast iron. The use of this glass for illuminating, as distinguished from ventilating, purposes, will effect a great economy; as it may be safely built in a house or church without the costly preparation of the window-frame. The proofs which we have witnessed of the strength and beauty of this material, and the numerous purposes to which it may be applied, render the discovery of M. de la Bastie a most valuable one. In connexion with this invention we recall that of which we gave some account in February last, namely, the sand blast, as pointing towards a mode of obviating the difficulty of working in the annealed metal.

One of the most remarkable features of the year has been the extraordinary amount of rainfall during the summer, and again in the latter months. Greater quantities fell than have ever before been measured in England; and the damage from the floods has been serious and widely spread. Much, though not too much, has been said about storing the rain-water; but in the case of such abnormal supplies the question really is, how most easily to send the rainfall to the sea? Our river valleys, as we have not unfrequently pointed out, are neither left in their natural state for the discharge of flood water, nor improved by the art of the engineer for that purpose. The use of water as a motive power has been so long regarded in the country as of the utmost value, that obstructions in the form of mills are to be found on every river. The artificial arrangement of the water-courses to feed these mills is the main cause of the flooding of our valleys. Steam power is now so much more available than any other, that even old-established water-mills frequently have auxiliary steam-engines. In the interest of agriculture, as well as in that of public health and safety, we must look forward to a systematic engineering of our river valleys, in which the removal of all dams and mills, except such as may be required for hydraulic purposes, in connexion with irrigation and with well-designed outfalls, will be a main feature. At the same time, the regulation of river courses and protection of their banks demand attention. The suffering and loss occasioned by the want of proper wharf walling to the Thames during the latter part of the year will not readily be forgotten. It is to be hoped that it will lead to the reparation of a neglect so disgraceful to the metropolis. We think it far from improbable that the increasing cost of railway working will, sooner or later, send back a considerable amount of heavy traffic to lines of water-borne communication. The neglected state of most of our canals will otherwise force itself on the attention of the country. Unless intelligent care be directed to the state of our river-valleys and main lines of water communication and natural outfall, trouble and cost are in store for us in the not very distant future.

The local taxation of the country shows an increase that demands anxious care on the part of the ratepayers. The total receipts under this head amounted, for 1874, to nearly 41 millions sterling, or more than half the national revenue. This sum includes two millions transferred from the taxes, and nearly seven millions of loan. The local budget, moreover, is being weighted by a constant increase of loans; the sums now borrowed or required being estimated at upwards of eighty millions sterling, or one-ninth of the national debt. But the rate of interest is nearly half as much again as that of Consols. The check which the constitution expects the House of Commons to provide against undue public expenditure is thus removed with regard to one-third of the amount. When payments for which the national faith is pledged, such as the interest on debt, and the cost of permanent establishments of all kinds, are considered, as well as the large sum now raised by the local rates, it will be seen that the power of the House of Commons in controlling expenditure is tending to become almost imaginary. Local extravagance

is easy, when unchecked, and its result, if allowed to augment, would very speedily double the burden imposed by the Legislature at Westminster.

The year has witnessed a degree of uneasiness and contention on the subject of the supply of labour, of which the most disheartening feature is to be found in the fact that the working classes appear to have learned but little from the disasters which they have brought on themselves. To say that the whole nation must, sooner or later, suffer with them, is but Job's comfort. The year opened with a long struggle in Wales, in which it became evident that a great amount of terrorism was exerted to compel the quiet and industrious workman to throw aside his tools. With the close of the year the struggle has been directed against the best resource of the superior workman,—piecework. At the same time intelligence comes back from New Zealand of the destitute condition of the agricultural labourers who were induced to emigrate to that country, in order to diminish the supply of labour at home. From all parts of the world echo complaints as to the condition of emigrants; and proofs of the fact that no paradise has yet been discovered for the thriftless and idle. It would seem to be no hopeless work to make it plain to those who live by their labour, that the price of labour is not a matter to be fixed by the seller alone. That is, in point of fact, the mistake that often underlies a strike. Indeed, seller and buyer together cannot absolutely regulate that price. Work is not to be created by the workman. It can only be done by him when wanted, and the more difficulty he throws in the way of doing it, the less will be wanted. The great stimulus to demand is certitude of adequate supply. When reasonable terms, and, still more, reasonable certitude, are not to be had, work goes somewhere else. Iron, for example, is made in other countries besides England, and England has exported half a million tons less in 1874 than in 1873. It can hardly be supposed that this diminution represents the loss of trade due to the strike of the past winter. Employers must not be left without blame in the matter. Liberal views at certain moments save money.

The progress of exploration during 1875 has been active and wide spread. Egypt, Assyria, Palestine, and Asia Minor are each yielding stores of long buried information. The discoveries of Monseiur Mariette, of Mr. George Smith, of Lieutenant Conder, and of Mr. Wood, have more interest than that of so many archæological researches, each considered apart. The combination of the information thus gained is throwing a continually brighter light on the history of the past. The most ancient books of the Hebrew scriptures are receiving unexpected illustration. We are recovering the history of Assyria back to times antecedent to the days of Abraham. The chronology of Egyptian history receives absolute verification from the Apis monuments, to which we alluded in a recent number. The identifications made by Lieutenant Conder of extant Arabic names, which are the equivalents of the Hebrew names given in the Pentateuch and the Book of Joshua, are so numerous and mutually so explanatory, that the topographical system of the writers of those sacred books has become distinctly intelligible. We may hope that when the Palestine Survey party resume the operations which were interrupted by a fierce attack by fanatical Moslems in August, the next campaign will so far advance the examination of the country that few, if any, local names will be left, out of the entire mass of places mentioned by the sacred writers, by Josephus, by Jerome, by the historians of the Crusades, and by the Arabic writers, that will not be accurately determined as to locality, and existing equivalent. From all this wide field of exploration comes the concurrent testimony that very often an early civilisation, of a high order, as judged by artistic or literary remains, has been overthrown by a deluge of barbarism. The results of Dr. Schliemann's investigations in the Troad, which we were the first to announce to the English public, have been made better known in this country, during the past year, by the publication of the English translation of Dr. Schliemann's narrative by Mr. Philip Smith (*Builder*, No. 1685). Nor can we omit to mention the gain to architectural history, no less than to metrical science, by the determination of the Jewish cubit and shekel, and of the Babylonian talent (*Builder*, No. 1693). Actual measurements of ancient synagogues in Galilee, made since those determinations were published, show that these edifices were built to the 16-in. cubit, according to the outcome of literary research. The bearing of a discovery thus positively verified on disputed questions as to topography and architecture is too obvious to need pointing out.

The art and the engineering of India have been brought, during the past year, more fully under the notice of the English public than had previously been the case. The establishment of a permanent Indian museum at South Kensington has brought before the public an instructive display of the great objects of Indian industry, of the national products of the country, and of that remarkable transition state of art spoken of as Græco-Budhist, of which we have yet so much to learn. The visit of his Royal Highness the Prince of Wales to India, the unexampled splendour of the homage of the native princes, and the ready grace with which the Prince has turned his attention to the wants of these his future subjects, are matters of the happiest omen, as well to the mother country as to her more colossal daughter and dependency. Fresh attention will thus, it is hoped, be directed to that vast system of public works, of which we have barely indicated the principal divisions. Especially in the protection and formation of harbours, and in the works of irrigation, reclamation, and river protection, is there open a vast field for the lucrative investment of sums of money, compared to which all that has been laid out in the harbours, canals, and railways of our own country is a trifle. A well-constructed irrigation canal in India is worth far more than a gold, or even than a coal, mine.

If the year has not been marked by the completion of any national or public buildings of the first importance, the work of the ecclesiastical builder has been active and unchecked, and the domestic architecture of the country is everywhere in the course of renewal. Something like three churches are built per week, and the repairs and restorations average nearly a church per week. The prompt appeal to a call for more churches at Leeds, when 32,000*l.* were subscribed in the room before the meeting broke up, is a remarkable proof of the voluntary energy of the supporters of our ancient institutions. The tendency, rather concentrated than wide-spread, to overthrow the Protestant rite, whether in the caricature of the Romish ritual, or in the return to an exploded style of architectural ornamentation, has received a decided check by decisions against the legality of certain notorious examples. The operation of the new law on the subject has not yet been tested. That very fact seems to prove the utility of the measure, as the mere knowledge that a more ready way was open for the enforcement of the law has had the salutary effect of keeping all parties more carefully within the limits of its injunctions. The art-questions of the time, the position of architecture,—what architecture has done and should do,—the cultivation of the general taste, and other subjects more entirely our own, we shall have occasion to treat separately and with more minuteness.

From a Christmas bright with the associations of old English comfort and hospitality, we look forward to the coming year, ignorant, indeed, of what it bears on its wings, but yet with much cause for hopeful cheerfulness. At the same time, we must all feel that it depends very much on the exertions of her children what position Great Britain is to maintain in Europe. Never was there a keener competition,—never were carefully taught and trained men in Germany, Belgium, and other countries more ready to seize the opportunity of any neglect or shortcoming, in order to get our place. We must remember that coals have been, in actual truth, shipped to Newcastle, that Belgian iron and French engines have been supplied to English customers. We have yet to save our homes from pestilence; to speed the plough by the aid of science; to stamp out preventible disease. Everywhere we have work to do,—in but too many places is there great slackness in the attempt to perform it. All around are those who will profit by our mismanagement. To a degree that was formerly unknown, the future of the country depends on our vigilance, honesty, forethought, and unslumbering industry. The world moves fast,—we must do so, or be left behind.

Baths and Aquarium at Hastings.—The tender of Mr. Adcock, contractor, of Dover, for the construction of the baths and aquarium at Hastings, has been accepted. The amount is 28,000*l.* The buildings will be commenced early this year.

REBUILDING AT THE STANDARD THEATRE.

THE National Standard Theatre in Shoreditch, although admitted to be the largest dramatic establishment in the metropolis—Covent Garden and Drury Lane not excepted—has hitherto had such an unpretending main frontage to High-street, opposite the Bishopsgate Railway Station, that a stranger would have some difficulty in finding its whereabouts. With the view of improving its external appearance, and at the same time giving increased facilities of approach to the auditorium of the theatre, the High-street elevation has just been entirely rebuilt, and the frontage to Bishopsgate increased in length from 12 ft. to 54 ft., and now presents an architectural exterior. In addition to the rebuilding of the frontage, the theatre has also been reconstructed to a depth of 110 ft. extending to the audience part of the house. The new Shoreditch elevation is 60 ft. in height, and the style of architecture adopted is Modern Italian. The ground-floor portion consists of ornamental pillars, from which spring three bold arches. The upper portion is built immediately over the arcade, above which is a balcony with balustrade. From the balcony to the cornice the elevation is continued with piers, between which are three arched windows, and in the centre the elevation is surmounted by a pediment. The elevation at the north angle is surmounted by a tower rising to a height of upwards of 80 ft., and at this portion of the frontage there is a separate entrance, with a stone staircase, leading to an intended skating-rink in the upper portion of the building, altogether distinct from the theatre. In the centre, under the arcade, there is an entrance and staircase, 12 ft. wide, leading to the dress circle, stalls, and boxes. The walls of this eptrance are divided into handsomely decorated panels, in which are placed mirrors 5 ft. in width and 12 ft. in height. The floor of the entrance is laid with encaustic tiles. Immediately adjoining the central entrance is another of exactly the same dimensions, and similarly finished and decorated, leading to the pit-stalls and upper boxes. New entrances have also been made at the south side of the building, which will now face the new street from Oxford-street and Old-street to Shoreditch, at present in course of construction by the Metropolitan Board of Works. These entrances are four in number, one to the pit-stalls, two to the pit, and one to the gallery. The newly-erected building also contains a large additional saloon, 38 ft. by 24 ft., and 26 ft. in height, in immediate connexion with the several tiers of boxes. The skating-rink in the upper floor of the newly-erected portion of the building, which, as we have stated, is quite distinct from the theatre, is very spacious, having a floor covering an area of 4,000 superficial feet, and in connexion with it are a number of retiring-rooms. No timber is used in the floors, which are constructed with Dennett's fire-proof arches, filled in and covered with asphalte. The floor of the skating-rink rests upon the external and party walls of the building, from which spring concrete arches, the flooring being in asphalte.

The architect is Mr. C. Fowler, of Woburn-place, and Old-street, Shoreditch, and the buildings have been carried out under the immediate superintendence of Messrs. Douglas, the owners of the theatre, by their own workmen.

DRESS AND REDRESS.

FOR the approaching juvenile fancy-dress ball, to be given by the Lord Mayor, the order is that all the costumes are to be of Calico. In the domains where Cotton reigns, such a determination is very reasonable, and consequent. Moreover, it will make practically evident what we have often endeavoured to urge,—namely, that the effectiveness of a dress need not depend on the expensiveness of its materials. Should this ball at the Mansion House assist in leading to a return to a less costly style of dress than is now usual, husbands and fathers will have cause to remember with thankfulness the time when Cotton was King in the City.

New Vestry Hall at Attercliffe.—The new vestry-hall and offices, erected on Attercliffe Common, for the township of Attercliffe-cum-Darnall, have been opened. They have been erected at a cost of 2,500*l.*, from designs by Mr. Hall, architect.

THE GENIUS OF DAVID COX.

WE mentioned a few weeks since that the Liverpool Art Club had got together a large collection of the works of David Cox. The national interest in the works of so gifted and so peculiarly English an artist, as well as the importance and representative character of the exhibition referred to, render this a fitting opportunity for a little more extended comment than we are generally able to give to picture collections out of the metropolis.

The drawings and oil-paintings of David Cox brought together by the Liverpool Art Club number nearly 450, and include adequate representations of all the "three periods" through which it seems now almost proverbial that all original artists pass. The first period of Cox's style is curiously at variance with that of his latest and greatest manner, of which one may say that his early works do not contain the slightest hint. They are mostly on a smaller scale than his later ones, and really show little that can be called genius in conception and execution; they are timid in manner, and hard and somewhat conventional in colour and manipulation. In the middle period his method of translating nature assumed a broader and more comprehensive character, and some of his productions of this period remind one a good deal of Girtin in their calm repose of effect, their broad and rather flat washes of colour, and their representation of nature rather by carefully considered gradation and balance of tone than by any realistic brilliancy of local colour. What his third period is like every one who knows anything of water-colour art is well aware; it was in this that his genius and individuality reached their real development, and in their power and entirely distinct and original style these works afford a remarkable instance of the development of genius, after a long course of probation and feeling the way up to its ultimate goal. What is the more noteworthy is that the character of Cox's latest work is to all appearance so remarkably spontaneous. In contemplating it one would be inclined to say that to such an artist the proverb *nascitur non fit* must be peculiarly applicable; yet, as a matter of fact, the attainment of this powerful, free, dashing style was the result of half a lifetime of labour and practice commenced from a tradition the very reverse of this; and the broad and often almost "splashy" manner of working by which the artist contrived to realise his finest effects, arose not so much from an inborn artistic afflatus or inspiration, as from the power, acquired by long and patient practice with his materials, of estimating precisely the value and effect of every touch, and thus realising an *extempore* facility in work which had become a second nature to his hand. The artistic gulf which separates this last from even his second manner is strikingly marked in the juxtaposition of two such works as the "Tivoli" and "Pen-maen-Bach-Road (1850)", Nos. 101 and 102 in the Liverpool Collection; the former has no date, but may be taken probably as a typical and very fine specimen of his second or "Girtinesque" manner, beautifully calm, rich, and lucid, though in a comparatively low key; while the second-named drawing represents in its fullest force that vigorous depiction of the wilder aspects and incidents of nature towards which the artist almost exclusively turned in the series of works which have given him his fame. It is in these that his peculiar individuality appears, and that he has given us what is most specially his own; for though his works of this period have been, somewhat inconsiderately, compared with Turner's, the fact is that the comparison between the genius of Turner and Cox is hardly more true in regard to quality than in regard to greatness and extent. His effects and his method of treatment were purely his own, and for the most part the spirit and feeling of his works also.

The chief characteristics of this last and fully-developed "David Cox" style may be said to be an effort to represent the movement and the feeling of Nature rather than the bare or detailed facts, and the restriction of the *technique* of water-colour to its most direct and at the same time most powerful and characteristic capabilities. In these works there is not an attempt at optical illusion, or at the polishing-up and manipulation of surface and texture until the idea of paper and paint is almost eliminated. For this species of excellence, now so much aimed at by artists in water-colour exhibitions, there are receipts to be had, and Cox, in spite of the modesty with which he is said to have deprecated any idea of his being able to compete with modern finish in water-colour, and expressed his contentment at working "in his own rough way," could no doubt have acquired this excellence of mechanical finish (which, in its way, we do not wish to underrate) had he aspired to it. But he spent his time far better. Practically, his reasoning, whether it were ever categorically expressed or not, even to himself, amounted to this. Water-colour is a means of representation by wet washings and blottings on paper. The minute facts of Nature cannot be represented in such a medium, except by losing sight of its primary characteristics, and transforming it into a system of washing down, and stippling, and finishing; and when all this is done, it remains a question whether the result was worth the labour, and whether we may not even have lost sight of the real poetry of Nature, as well as of the freshness and brilliancy of colour in the drawing, in this elaborate aim at detailed fulness and accuracy; an aim, too, which can at the best be only partially realised. But the broad facts of nature, which are what we most look to and which most deeply impress us, can be represented by this system of colour washing in its purity, accepting the fact that it is a system of washes on paper, and not a carefully-prepared illusion. Cox's finest works of this period seem to say openly to the spectator, "this represents the feeling, the tone, the harmony of such a scene, and indicates its movement, so far as water-colour and brush can translate it to you." There is not an attempt to hide or mask the *modus operandi*—the signs of the brush are visible all over the paper; often there is scarcely an attempt even to round off and give realistic effect to such objects as clouds, lest the characteristic aërial freshness and brightness of the pure tones of colour should thus be lost or impaired. The artist gives us all that his medium of expression can give most powerfully and most suitably to its character and capability; and there he stops short; "thus far shalt thou go and no further" seems to be his motto. In connexion with this reflection, the following remarks from the essay attached to the Art Club catalogue, by Mr. William Hall, of Birmingham, who appears to write from personal knowledge of Cox, may be interesting:—

"As respects the colours he used, his materials, and method of working, David Cox for many years used the old hard cake colours, which he ground into saucers, large or small, according to the dimensions of his drawing. Afterwards he adopted the moist colours of modern invention. His range of pigments was limited to those of a simple and what may be termed an old-fashioned kind. When he took his second sketching excursion into Wales, in 1806, his colours were only three or four,—such as lake, gamboge, indigo, and perhaps another. With these he imitated the varying hues and effects of nature as he best could. In course of time he increased the number of his colours. Cobalt, vermilion, light red, yellow ochre, sepia, burnt sienna, brown pink, and one or two others, were added to his box. Emerald green also was to be seen there; but of this he used little, merely for an occasional touch on the draperies of his figures, or the mossy coating of a stone or tree-trunk. He cared nothing for the pretty pigments of modern days. With large sable pencils, well filled with the required tints, he flooded and saturated his paper, so that it should be thoroughly stained, with a view to durability, securing his effects generally at the first trial. The writer has seen him, when in Wales, working on wet days at three or four drawings at the same time. To begin, he would mix a quantity of sky-colour, sufficient for all, if he intended them to resemble each other in tint, say varying shades of grey, and then he would take up one outlined sketch after another, *mopping away with a large brush as fast as he could, the colour running down his paper in floods*, cloud forms and other peculiarities being rapidly shaped and indicated. Whilst one was drying he was proceeding with another, taking them up again in proper turn, gradually progressing with his subject, introducing colour in the lower parts and nearer objects, and securing light, shadow, and effect, until the work assumed a finished appearance. Many of his outlines were drawn in charcoal, sometimes in black and red chalk. He would put in the shadows with great spirit, and draw the forms characteristically and firmly, then go over the whole with plenty of colour, leaving the charcoal or chalk to show through. The effect sometimes was very happy. Cobalt was his colour for the azure of the sky; this mixed with light red or vermilion, or occasionally a little lake, with perhaps the addition of a small portion of yellow ochre, represented the shadows of clouds and extreme distances of his pictures. From the remote parts he worked down to the middle distances, breaking into warmer and more positive tints, marking forms more distinctly, and increasing in power by the introduction of quiet greens and other local colours of the right atmospheric quality for the distance,—his greens compounded of indigo, lake, yellow ochre (or gamboge). In his foregrounds he used the more transparent and powerful colours,—indigo and gamboge, indigo and brown-pink, indigo and sepia or Vandyke brown, sometimes enriched with burnt sienna or lake. Raw sienna (in water colour) he rarely or never employed. Body colour, so much used in the present day, he studiously avoided, except for a sharp touch here and there on his figures, or for bright lights on the details of his foregrounds, but always in the smallest quantity. He sometimes executed drawings entirely in body-colour, but merely as experiments or in freak; these are much inferior to his works of the usual kind. Many of the drawings of his latter time were executed on a coarse low-toned paper, manufactured in Scotland for wrapping up reams of paper of another kind. This paper, though full of specks and occasionally creased, he was very fond of, as it enabled him to get great power and richness of colour at once, and supported those solemn grand effects characteristic of many of his late productions."

In proportion as Cox developed his latest and freest style, it is noticeable that the local colour in his scenes becomes purer, brighter, and more strongly contrasted. His latter works exhibit, in regard to colour as well as execution, the perfection of what may be called the "natural" manner in water-colour; in which, while form is sometimes but roughly indicated, the colour is as nearly as possible that of nature herself, in her own real strong decided tones, not in the balanced opposition of half tints which Girtin brought to such excellence, and which, as we have observed, Cox practised during a portion of his artistic career. The art with which these strong open-air tones, and the broad forcible touching by which the characteristics of different objects are given, are nevertheless blended into a homogeneous whole without the slightest appearance of spottiness or over-strong contrast, is remarkably examplified in such scenes as "The Green Lane in Warwickshire" (171 in the Art Club collection), where we are equally struck by the brilliancy of separate portions and the entire unity of the whole. The aim at a direct and intense expression of the leading character of a scene—a momentary aspect caught and fixed in all its most striking and predominant characteristics, and emphasised to the utmost by the subordination of parts to the whole, is evident in most of Cox's later works. In the "Mountain Pass near Capel Curig" (82), the white clouds seen over the crags seem massed and piled in square forms as if to repeat the character of the scene, with that sort of "building up" of a landscape in which Cotman showed such power. "Peat Gatherers" (66) is another splendid example of combined simplicity and power, and subordination of everything to the one object, the expression of desolation and expanse. The drawing of the "green lane" just now referred to forms one of a remarkable row of five works hung together in a line, and which amongst them illustrate all Cox's most typical qualities. The first of these, "Lancaster Sands" (149), is one of the later of his middle period (it is dated 1839), and one of the few which really give ground for likening his manner to that of Turner; it might pass for an early Turner, in general manner, tone, and treatment, very naturally. The next one to this, "Caer Cannen Castle,—the Rain-cloud" (152), is a subject on a grand scale, and exhibits in one sense the very height of the artist's powers, though before he quite settled into his last manner. Here, again, there is possibility of comparison with Turner, more especially in regard to the splendid effect of both aërial and linear perspective and distance. In the next one, "The Stubble Field" (161), dated 1843, we have a much less ambitious subject, but the manner is David Cox pure and simple, no longer capable of comparison with Turner, or with any one but himself. The reality and the vividness of the aërial tints in this drawing, with its bright breezy sky, is such that one almost seems to feel the air and the sunshine. "The Vale of Dolwyddelan" (165) is one of the greater subjects again, but we should certainly surmise it to be later than Caer Cannen Castle (neither of them is dated), and the manner seems more individual and incapable of being ranged with that of other artists either greater or less than himself. The massive treatment and homogeneous spirit of the whole is as remarkable here, in this line of mountain stretching away into the deep dusky haze of the distance, as in that Capel Curig scene above mentioned; and the complete knowledge with which Cox made his materials serve him is very remarkable here, in the perfect discrimination of the character of the rocky and grassy surfaces in the foreground and middle distance, though a close inspection fails to detect any special attempt to give texture except by tone, and the disposal of light and shadow. Among the finest and most typical examples of his last manner here may be mentioned "On the Holyhead-road" (78); "The Flood" (74), in which, however, the artist has attempted a little more than quite explains itself in the drawing, grand and suggestive as it is; and "Asking the Way" (92). This last is a perfect thing of its kind; the skirts of a wood in twilight, with the last glimpse of light in the evening sky, most powerfully given, over the dip of the ground to the left; and the two figures in the foreground are most happily

conceived so as to give a touch of human interest to the scene, without impairing its wild and lonely expression.

More than fifty of the works at the Liverpool Art Club are oil-paintings, among which is included that remarkable one the "Welsh Funeral" (57), in which Cox showed such success and so much pathos in his mode of dealing with numerous figures as to make one wonder that he did not oftener make figures an important feature of his works; in general they are completely subordinate to, and subservient to the effect of, the landscape. This favourite subject is represented, it may be observed, in two or three different pictures, showing a varied treatment of the same scene. Cox's style in oil-painting is neither so powerful nor so individual as in water-colour; but it is a very admirable style in its full and broad use of the material; and those who are familiar with the works of the modern French school of landscape painters cannot fail to be struck with the similarity, in some important respects, of Cox's manner to theirs, in his full thick use of the pigments and his disdain of mere detail and touching up. It is recorded, indeed, that he was in the habit of using his palette-knife to "break up and blue those parts of his foliage-painting which he considered too *touchy*,"—his own highly characteristic expression. Of the oil-paintings at Liverpool the most remarkable, perhaps, is "Going to the Hayfield" (29).

Referring to the very overstrained comparison of Cox with Turner which is now being set up, we must say that there is no pretext for putting him for a moment on a level with the greatest and most varied poet in landscape who has ever painted; and the present exhibition in Liverpool, however brilliantly it displays Cox's power and genius within his own boundaries, also shows his limitations. There can be no question that the collection, as a whole, shows a certain sameness of character and feeling in each of the three periods it illustrates; and it is only in Cox's last, and in the later part of his middle, period, that he can claim the high standing he has gained. His earlier works are, on the whole, mediocre; at any rate they would not raise his name to anything like the highest rank in his art. It is necessary to point this out, because Mr. Hall's essay attached to the catalogue of the Art Club, from which we have more than once quoted above, indulges in an exaggerated estimate of its object, which can do no good, and is uncritical. It is remarked, for instance, that "Cox painted almost every conceivable subject within the range of art,—fish, flowers, still-life, portraits, figures, interiors," &c. This is quite a misleading statement, if taken to imply that he showed an equal and "all-round" power at all these things. He painted them all, no doubt, at different times, and "The Water Tower, Kenilworth" (61), and the sketch of the "Commercial Traveller at Lancaster Hotel" (295), show what he could do with architecture and figures respectively, in the way of spirit and character; but it would be absurd to pretend that his genius is shown in these as conspicuously as in his landscapes, or that his power even in landscape was unlimited, though it was of the very highest class within its own scope. Mr. Hall thinks that in rendering the every-day aspects of Nature Cox was "superior to Turner," from which remark we should surmise that he is less acquainted with Turner's water-colours of this class than with Cox's. The writer's enthusiasm, indeed, quite runs away with him, and in one paragraph of the essay we counted twenty-seven (!) marks. This kind of "gush" is bad literary taste, and tends, moreover, to defeat its own end, and editors of future catalogues of the Liverpool Art Club exhibitions should put a check on it.

The collection should, however, be visited by all lovers of art who may be going within convenient reach of Liverpool. It will be open, we believe, till the 15th of January.

Presentation.—Last week a number of the surveyors' clerks and foremen, in the employ of the well known firm of Messrs. William Cubitt & Co. met together at the Castle tavern, Farringdon-road, for the purpose of presenting Mr. Cornwell (who has been connected with the above firm for upwards of forty years) with a testimonial, consisting of a handsome timepiece and vases to match, as a mark of the respect and esteem in which he has been held by them for so long a time. About sixty of the subscribers afterwards dined together.

A REVISED THEORY OF LIGHT.

SOME of our readers may remember a somewhat lengthened and interesting correspondence which took place in our columns in the year 1868, set in motion by our notice of Mr. Benson's work on colour, in the *Builder* for July 25th of that year. It was in the course of that correspondence, in which Mr. Benson himself, Mr. Crace, Mr. J. K. Colling, and others took part, that Mr. Cave Thomas, in a letter published by us on September 19th of the same year, first briefly propounded that view of the relation of light and colour to vision which he has now published in a more detailed form in the small book entitled as above,* and which forms "Section I." in his proposed consideration of the subject, and deals with "the various sensations of light and the theory of the harmony of colour"; while "Section II." is intended to take up "the theory of vibratory or mechanical action, producing the sensation of light."

The original letter of Mr. Thomas, just referred to, was rather *apropos* of the discussion which occasioned it, than in direct continuance of it; but his theory must be considered as bearing upon, and to some extent connected with, the new theory of colour which has found more than one able exponent of late.† The point most easily laid hold of by general readers in the theory of Mr. Benson (founded mainly, we believe, on the views of Professor Maxwell and of Helmholz) is the degradation of *yellow* from its position as a primary colour, and the substitution of *green* in its place. It would be going out of our way to discuss the point in the present notice, further than to remark that the special theory referred to is the result of a special method of investigation, and is based upon experiments and combinations, not with pigments, but with light, that is to say, with refractions and reflections of coloured rays; and that such a process has the radical distinction from processes carried on with pigments, that whereas the addition of a primary colour to compound a secondary in pigments is accompanied by a withdrawal of light, the process of addition of two primaries in experiments with actual light is an addition of light,—an increase of brightness. This is illustrated by a diagram originally published in Mr. Benson's book, and reproduced by Mr. Church, in which Mr. Benson's three primaries, red, blue, and green, are shown in the form of circles of these colours, all intersecting in the centre of the diagram, which represents white, while the secondaries, yellow, pink, and sea-green, are the portions where only two colours intersect, and the outer segments of each circle, representing red, blue, and green, are the least luminous portions, having had a double proportion of illuminating rays withdrawn from them. This involves a serious reversal of all we have been long taught to think; and, moreover, it is at variance with the actual results of pigments, which do coincide with the "red-blue-and-yellow" theory,‡ as, in fact, the theory probably arose originally from the results obtained from pigments. At the same time, there can be no question that the researches and experiments of Mr. Benson and others have gone far enough to strike a serious blow at the old theory, regarded as a statement of the harmonic relations of colours, and that in such investigation experiments in light must needs take precedence of experiments with pigments, which are to actual coloured rays what moonlight is to sunlight.

It is in connexion with this view of the subject that Mr. Cave Thomas's speculations come in, as a main object of this first part of his book is to lead the minds of his readers to the consideration of light as a system of vibrations affecting the sense of vision, and of colour as a series of phenomena purely referable to the sense of vision, and having no objective or external existence whatsoever. That the sensation we call "light" is the offspring of vibratory motion,—that light does not as a substance travel, but that its pulsation movement alone travels, just as the pulsations of sound extend from the first impulse which sets them in motion, may be accepted now almost as a scientific truism; and we think it is a question whether some part of Mr. Thomas's elucidation is not superfluous, in the case of any readers possessed of ordinary education and reasoning power, and whether occasionally he does not treat what is really a mere question of verbal expression or definition as if it involved a scientific principle. "It is," he observes, "very difficult to accept the conclusion that pictures have no inherent colour,—that they are merely skilfully graduated surfaces reflecting the various colour-producing vibrations; that the coloured pictures exist only in our own and other person's eyes; and that possibly pictures do not produce precisely the same sensations of colour in any two people. What is called colour blindness is a defective organisation,—there is no colour to see. The vibrations in this case only fail to produce their ordinary concomitant sensations." Now, while fully admitting the great value of the extension of our mental and critical view of the subject afforded by a truer and fuller theory, and the suggestiveness which such a theory often has in its bearing on practice, may we not say that the foregoing sentence (the last remark especially) is merely an enunciation of a familiar fact in unfamiliar words? Practically, does it make much difference whether we say that a person "cannot see red" (the commonest form, probably, of colour blindness), or whether we say that certain vibrations fail, in his case, "to produce their ordinary concomitant sensations"? This is merely substituting the expression "vibration" for the more familiar expression "colour." Such an expression may be of use in teaching the unscientific reader to think in proper terms, but the phenomenon of red remains precisely the same to the same person, whether he regard it as paint on a board, or as vibrations exciting his retina. It is a misuse of language to say that the vibrations produce the sensation of colour, for the vibrations *are* the colour. A certain amount of verbal ambiguity of this kind appears to us to be a recurrent feature in Mr. Thomas's thoughtful and suggestive little book, and leads sometimes to unnecessary refutations, as where (p. 13) he formally urges that the *spectra* seen after looking at the sun, or at any strong light or colour, have no existence external to the eye,—a point on which one would imagine no intelligent schoolboy needed instruction. On the other hand, where the author remarks (p. 20) that "every sensation of either black, white, or colour, produced by external causes, is followed by its *compensating colour spectrum*, which balances and restores the even tenor of the optic nerves," he himself falls, verbally, into the same inaccuracy; for the sentence certainly infers the external existence of the colour spectra as an influence on the optic nerve. The truer expression would surely be that the effort of the optic nerves to recover their balance produces the counter excitement which gives rise to the spectrum.

Apart, however, from what we cannot but regard as a deficiency in its methods of statement, the considerations on the harmony of colour presented here are full of value and interest. And we must say, also, that there is something logically convincing in the author's way of putting the case for the deposition of the old dynasty of "blue-red-and-yellow" as "primaries." He denies the existence of any "primaries," unless the word be used only in regard to order of time or succession. Colours being sensations, are all alike indecomposable, and each is succeeded by a reaction or *libration* towards its contrary. In other words, there is a mean combination which satisfies the eye, and any deviation from this mean towards one extremity of the chromatic scale must be followed by a corresponding complementary deviation in the opposite direction. "What used to be called a *secondary* colour is succeeded by the ocular spectrum of a primary; and what used to be called a *primary* is succeeded by an ocular spectrum of a secondary. And not only is this the case with sensations of colour, but also with those of black and white; the impression of a black spot is succeeded by a spectrum of a white spot, and *vice versâ*."

. . . . "We cannot affirm more in respect to the harmony of colour than that there is a binary, mutually compensating series, or that every sensation of colour to satisfy our being should be either accompanied with, or succeeded by, one of a directly opposite kind. The terms primary and secondary could, therefore, only be appropriately applied to the order of succession—for a spectrum of orange succeeds a sensation of blue, and a spectrum of blue the sensation of orange. Thus in the Polariscope a beam of waves may be divided, two and two, the combina-

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* The Revised Theory of Light. Section I.: The Principles of the Harmony of Colour. By W. Cave Thomas. Smith, Elder, & Co. 1875.

† We may particularise Mr. Church's admirable little manual of "Colour," in which the author evidently leans towards the new theory, as in accordance with scientific experiment, though admitting the convenience of the old one as expressing the results with actual pigments.

‡ Of course, Mr. Benson's diagram of the primaries which we alluded to is an artificially prepared one; not the actual result of super-position of transparent colours on the paper, but an illustration in pigments of the effect of combinations of coloured rays.

tion of each pair of which will be equal to white light. And if the prism refracts an infinitely differentiated series of rays, we may be mathematically certain that there is a certain mid point from which every ray on one side will have its compensating ray on the other, which, two and two together, will be equivalent to white light. The experience to be gathered from an examination of the phenomena of *ocular spectra* points to the same conclusion, for the *ocular spectrum* to every colour sensation which can be produced by the prism, is one which compensates or neutralises that sensation. And the two waves of different periodicities which produce both these sensations, would in combined action produce the sensation of white light."

We must confess that this statement of the case appears to us to have the characteristics of a true theory, comprehensiveness and simplicity combined. For the detailed illustrations of it, chiefly by observations of the phenomena presented by the ocular spectra, we must refer the reader to the book, which, small and condensed as it is, is quite worth procuring by all who are theoretically or practically interested in the subject. The author has a tendency occasionally to push a statement farther in support of his view than it can fairly be made to go. For instance, we all know that "bright colours may be seen when the eyes are closed, particularly in the morning, when the eyes are sensitive after sleep; children frequently amuse themselves with these phenomena." But we can hardly accept this fact as a sufficient basis for the statement, to which special attention is drawn by the italics of the author, that "therefore we receive from external sources no impressions of light which may not also be produced from internal excitement of the nerves." But the recorded observations on optical spectra certainly tend to bear out the main theory advanced. The following is significant:—

"The most decided way to convince people of the existence of *ocular spectra* is to make them momentarily glance at the sun, after which a dark *spectrum* will appear on turning their eyes towards a (white)* surface, and will assume different colours, passing from dark to light in the following order,—black, blue, green, yellow, white; if, on the contrary, the eye be closed, after a similar act, against all external action of the sun's rays, the coloured *spectra* will succeed each other in an inverse order of white, yellow, orange, blue, violet, black. The preceding facts prove that the eye, and the eye alone, is the realm of light, and therefore it is that the perfectly organised sense is the true meter of chromatic harmony. Moreover, these experiments clearly demonstrate the fact that the eye itself has the power of decomposing a beam, of resolving the original force or forces producing the sensation of white light into different colours without the intervention of a prism. Or are these effects produced by the differentiation of the original force by *libration?* All these facts will be found of the utmost importance when we come to the revision of the mechanical theory of light."

All persons, it is admitted, are not equally susceptible to these and similar phenomena. "Some see them without any trouble, others with difficulty. When once seen, the observation is repeated with extreme ease; when, however, they and their laws of production are known, their constant presence frequently becomes tormenting, so we counsel only an occasional, and not a too prolonged observation of them."

We shall, at all events, look with interest to the further statement of the author's revised theory. We trust, however, that it is not through the tormenting presence of these *spectra* which he has raised that Mr. Cave Thomas seems, as far as we have public evidence, to have rather neglected of late the practice of the art which he illustrates even better with the brush than with the pen. Despite the interest and thoughtfulness of his writings, we could not accept them as full compensation for the loss of, we must not say his "paintings," but of those special vibratory impressions on our retina which he was accustomed to produce through the exciting agency of canvas and pigments, which we should be glad to be oftener exposed to, and about which at least there is likely to be very little difference of opinion.

* This and the names of colours are placed by the author within brackets merely as a reminder that they are made use of in the popular sense, and not as implying any local existence of colour in a scientific sense.

DOINGS IN EDINBURGH.

A GLANCE at the architectural position at this the commencement of another year leads to the conclusion that there is a greater amount of work in prospect than has been accomplished during the past one; but then it must be kept in view that works of considerable importance are now in progress, some of which will not be completed even at the expiry of twelve months hence.

This has been called an irreligious age, but if we are to form our judgment upon materal results the opposite conclusion is the more tenable one. Everywhere new churches are arising, built by the voluntary contributions of the faithful, and in these edifices we find the desire to make them fit temples for the worship of the Most High a matter of graver consideration than it was wont to be. Amongst the completed churches here, we note the Palmerston-place United Presbyterian Church, designed in the Italian style by Messrs. Peddie & Kinnear at a cost of 15,000*l.*; the London-road United Presbyterian Church, designed by Mr. Starforth, a good example of modern Gothic as adapted to congregational worship; and the Abbey Parish Church, designed by Mr. R. Moreham, a large Gothic building, occupying a prominent position at Norton-place. These three churches are notable additions to the architectural features of the city; and besides these others of less importance have been erected in more obscure positions.

As to street architecture, the new Clarendon Hotel, in Princes-street, is completed as regards the elevation. In style it is Italian, and, although displaying neither freshness nor vigour of treatment, it is in good taste, unobtrusive, and sufficiently decorative for the important position it occupies. Combined with the hotel is an arcade, a new feature in Edinburgh. The entrance thereto is by an opening 21 ft. wide in the centre of the elevation. The treatment of this opening is the weakest point in the design; instead of being spanned by an arch, as would necessarily have been expected, there is a large lintel surmounted by a semicircular pediment, having a very heavy effect. Mr. Beattie, who designed the hotel and arcade, is also the architect of new premises in St. Andrew-street, for the Young Men's Christian Association. The narrowness of the frontage and the great height of the building cause it at present to appear at a disadvantage, but this defect will doubtless be remedied in course of time, as it is highly probable that ere long the valuable sites in this neighbourhood will not continue to be occupied by the comparatively low and poor buildings at present there. In this instance Mr. Beattie has adorned the *façade* with broken pediments, festoons, &c., and crowned the cornice with dormers having elliptical pediments.

In certain quarters a most unfortunate desire has sprung up to produce grand effects at a cheap rate, and some plain and substantial buildings have been recently taken down to be replaced by lofty brick erections, coated with cement, and this, too, in the leading throughfares at the west end. Such structures can never be to the credit of the architect, whatever profit they may otherwise bring him.

These productions, amongst other things, have led to the formation amongst men of taste of an association the object of which is to keep an eye upon the amenities of the city, and to use what influence they may possess with those who, as the late Lord Cockburn (from whom the association takes its name) said, were doing their best to destroy the beauties of the city.

Of works in progress, the most important is the Cathedral, which is progressing slowly but satisfactorily. The outer walls are built up as high as the window-cills, the doorways have been arched over, and the columns of the nave are in place. The Catholic Apostolic Church is now roofed in, and the interior disencumbered of scaffolding. This church has altogether the look of a Mediæval product, which has sprung up to life in these modern days, and yet it is strictly utilitarian. The nave is simply a large oblong, without any obstruction, but picturesqueness is produced by the windows being placed a great height from the floor, and by three arches at the east end forming openings to the church and side chapels. The exterior has at present a rather gaunt effect, but when the great west tower is added it will be solemnly impressive. At Hope Park a small but elegant Congregational church is approaching completion. It is Early Italian in style, having two tiers of circular-headed windows, the lower tier consisting of groups of three, and the upper of windows of larger proportions, divided into two lights by shafts having foliated caps and a circular pierced opening at the apex.

The medical wards of the new Infirmary are nearly completed, and the surgical and administrative departments are in active progress. The ultimate cost of the whole is now stated to be about 300,000*l.*

The remaining building stances in Chambers-street have now been taken up, and building operations are going on, but fitfully. This promises to be one of the most effective streets in the city, and point will be given to it by a slight departure from the original intention in consequence of a central stance having been secured for the erection of a church. The church has been designed by Mr. R. Thornton Shiells in the Lombardic style, and is intended to harmonise with, and yet be distinct from, the other elevations.

Considerable progress has been made with the new Episcopal Church at Merchiston, which promises fairly. It now turns out that the selected design will cost double the sum to which the competitors were restricted. This appears to be the abnormal result of competitions, but still they go on.

Two stories of the new premises for the Union Bank in George-street are in place. The detail is as bold and effective here as in other works by Mr. Bryce, but it hardly shows the same play of fancy as the premises he designed for the Western Bank, now occupied by the Scottish Widows' Fund Assurance Company, and which are similar in style.

Last season two theatres were destroyed by fire. These are replaced by others of a superior order, and an entirely new one upon a truly grand scale is in progress.

The "Southminster," in Nicholson-street, now called "The Queen's," being situated in a back court, no attempt at external decoration has been made. It is seated for 2,500, the auditorium being 80 ft. by 90 ft., and the stage, 75 ft. wide and 44 ft. deep.

The rebuilding of the Theatre Royal is expected to be accomplished next month. The principal elevation towards Broughton-street not having been affected by the fire is to be retained, but the interior is to be greatly improved by taking in two shops which formerly existed; the accesses, which were very cramped, will thus be enlarged and accommodation will be provided for an additional 300 sitters, bringing up the whole to 2,000.

Under the energetic superintendence of Mr. Gowans, great progress has been made with the new West-end Theatre, the site of which has for some months been a scene of remarkable liveliness. It has not been found practicable to complete the façade, but, still, what has been done in the time is surprising. The first story has, however, been erected, and from the great size of the openings (the central doorway is 30 ft. in height), the depth of the reveal, and the massiveness of the materials employed, the ultimate effect can hardly fail to be impressive. In the mean time a temporary brick wall screens off the interior from the street, which is so far completed as to be in use, and it may be safely pronounced as one of the most elegant and complete in the kingdom. The auditorium is 70 ft. square and 58 ft. high; the proscenium, 32 ft. in height and breadth; the stage, 74 ft. broad, expanding to 114 ft. Accommodation is provided for an audience of 3,000, comprising 1,000 in the pit and stalls, 400 in the private boxes and dress circle, 600 in the amphitheatre, and 1,000 in the gallery, and from every point a good view of the stage is obtained. The entrances, staircases, and retiring-rooms are unusually spacious, comprising an ample crush-room and refreshment-rooms. The style of decoration is of the modern French type, boldly modelled and picked out in white, blue, and gold. Over the proscenium are three figures symbolic of music. The ceiling represents the sky flecked with fleecy clouds, and in the centre is a sunlight, which is supplemented by other lights distributed around. Every endeavour has been made to secure ventilation and a comfortable temperature by means of steam pipes in winter and a large punkah in summer. It can now be said that no city is better provided with theatre accommodation than Edinburgh, and we may now look for the entertainment bearing a greater resemblance to what was provided fifty years ago than what has been given of late.

The first of the new School Board schools has been opened. Like all the others in progress here, it is Gothic in style, artistically treated, but with little enrichment.

Operations are in progress for the covering in of the fruit and vegetable markets, and a new fish-market is contemplated.

Nothing has as yet been done towards the formation of the new medical class-rooms for the university. The buildings in Park-place and Teviot-row, the site of which they are to occupy, have been acquired, are vacated, and will shortly be demolished.

The designs for the new buildings, by Mr. R. Anderson, are in the Early Italian style, and display considerable elegance and picturesque-

ness. A marked feature of the group will be a campanile rising from the midst, which bears rather too great a resemblance to that at St. Mark's at Venice. This building will be a great improvement to the neighbourhood, and a noteworthy addition to the architecture of the city.

Little has been done towards the completion of Jeffrey-street. Negotiations have been pending between the North British Railway Company and the Improvement Trust for the purchase by the company of the ground upon which the north side of the street was intended to be built, but the parties are not at one as to the value of the ground. The Cockburn Association have taken up the matter, representing that by leaving the ground unbuilt upon, the appearance of the neighbourhood would be greatly improved, and the view from the North Bridge be left more open. The addition to the breadth of the North Bridge has added greatly to the convenience of traffic, but the iron balconies, with useless heavy parapets made to resemble stone, are excessively ugly. It is to be regretted that an architect was not conjoined with the engineer in carrying out this work.

Three new statues are to be erected in East Princes-street Gardens: one to Dr. Livingstone, to the east of the Scott monument, the other two to Professor Simpson and the late Adam Black, M.P., respectively, to the west thereof. The pedestal of the Albert Memorial still waits for the sculpture, and the statue of Dr. Chalmers we look for in vain. We must not forget also to mention that a memorial cross is to be erected in memory of the late worthy Dean Ramsay in a prominent position in the ground attached to St. John's Church in West Princes-street.

Upon a retrospect of the past year, we come to the conclusion that there is more calling for congratulation than for regret, and that the balance is greatly in favour of the amenity of the city.

THE PALATINATE BUILDINGS, NEW KENT-ROAD.

WITHIN the last few months several large blocks of buildings, intended as residences in flats for the middle classes, have been in progress of erection on a plot of land in the New Kent-road, near to the Elephant and Castle railway station. The name given to the new buildings is the "Palatinate," and when entirely completed they will cover a ground area of nearly two acres in extent, with a main frontage to the New Kent-road of more than 200 ft. in length. One of the principal blocks facing the last-named road, is already finished and occupied, whilst two other blocks immediately in the rear, with frontages to two newly-formed streets, running out of the New Kent-road from north to south, to a depth of upwards of 300 ft, are almost ready for covering in. The buildings are very lofty, being carried to a height of nearly 80 ft. The elevations fronting the New Kent-road form the principal architectural feature. The ground-floor portions of this part of the structure consist of large shops, with a spacious entrance and staircase in the centre to the private dwellings in the upper part of the buildings. The materials used are stock brick, with artificial stone dressings and facings, and at the foot of the second and fifth floors there are ornamental projecting iron balconies. All the several blocks have flat roofs, open and clear to their full length, and there is access to them from all parts of the buildings, the roofs themselves being available for both drying purposes and recreation. The side blocks running from north to south, although of the same height as those facing the New Kent-road, are somewhat different in their external architectural character. They are intended to consist entirely of private dwellings, and from the ground-floor to the third story there are continuous bay windows. The internal arrangements of the buildings, and the general plan of the several dwellings, are being carried out with the view of accommodating both large and small families belonging to the trading and middle classes, and whilst some of the tenements contain only four apartments, others have as many as eight. Each dwelling is entirely complete within itself, including, as regards apartments, convenience for every domestic and social requirement. There are parlours or day-rooms, and bedrooms, together with kitchens, completely fitted with modern ranges, and other requisites for general culinary purposes, and the windows of all the dwellings are fitted throughout with Venetian blinds. As the several blocks and tenements are completed, tenants appear to be ready to occupy them, those already finished being all taken at rents varying from 10s. to 20s. per week, including all rates and taxes. Gas is also laid on so as to admit of every tenant availing himself of it, and burning it by meter, as in the case of an ordinary dwelling. It is stated that when the whole of the blocks now building are finished the total number of tenements will be upwards of 300.

The buildings are being erected by the owners, Messrs. Sutton & Dudley, contractors.

MOVEMENT IN INDIA.

THE Government of India has determined to spend about ten lakhs of rupees in purifying Simla, and in introducing a new water supply from a source about eight miles distant. This is a small sum, but the editor of the local paper says he should like "to see the face of the British Chancellor of the Exchequer if any one were bold or insane enough to propose to expend out of the public revenues 100,000*l.* for the cleanliness of Eastbourne or Hastings."

Proposals are on foot for the establishment of an institution, to be called the Albert Hall, for the promotion of social intercourse between natives and Europeans. The Maharajah Holkar has given 8,000 rupees towards the expenses. The Maharajah is also pushing on the completion of his new palace at Jummoo, and large quantities of material for its furnishing and decoration are daily arriving from Calcutta.

It is proposed to erect a "Noble Boarding College" at Hyderabad, similar to the Mayo College at Ajmere.

An old project has been revived of working the abundant slate beds which are said to exist in the Khassi and Jaintea hills.

About 10,000 of the ratepayers of Calcutta have signed a memorial, which has been presented to the Bengal Council, praying for an elective municipality, hoping thereby to solve many difficult problems in municipal administration in India.

Although two months have passed since the fine equestrian statue of Lord Mayo arrived in Calcutta, no site has as yet been allotted for it, and the local journals are expressing a hope that the Prince of Wales will either ask where it is, or stumble over the packing-cases which contain it, when it would be erected in two or three days, instead of remaining concealed, perhaps for years.

During his recent visit to Bombay, the Prince visited the European Hospital there, and his inspection only served to confirm the statements of the Sanitary Report respecting the condition of Indian hospitals in general. In the obstetric ward H.R.H. called for a thermometer, but finding that none was provided, accepted the assurance of one of his staff that the apartment was much hotter than it ought to be. Before leaving, he complimented the officials, but at the same time said he thought a new hospital ought to be erected, as it was quite evident that the present one was totally unsuitable for European invalids.

UNHEALTHY OCCUPATIONS.

The first of a course of lectures by Dr. B. W. Richardson, F.R.S., entitled "Industrial Pathology; or, the Influence of certain Injurious Occupations on Health and Life," was given under the auspices of the Society of Arts, at their Hall in John-street, Adelphi, in December last. The lecturer, after touching upon the action of a committee of the Society in reference to the subject of his lecture, referred to what the Government had done in the way of collecting information, which, though not so comprehensive as could be wished, was still very valuable. Among other inquiries he instanced those of the Factory Acts Commission, the Commission on Children's Work, and the Sanitary Commission. The figures he should put before the meeting were taken from the returns of Dr. Farr, the Registrar-General, to which he had been permitted to have access while they were in the press. It was while waiting for the grander inquiry that the work of such a society as the Society of Arts became useful. The calculation was based on the census of 1871, and was composed of six classes, the first of which was the professional class, which numbered 684,102 persons. Following that was the industrial class, in which there were numbers of women, and which included 5,137,725. The third class was called the commercial, and contained 815,420 persons. The agricultural class included 1,657,138, and the domestic class, which included many women, was 7,399,582. The industrial class was that which they had especially to consider in the lecture, and this class numbered 5,137,725, of whom 1,521,938 were women. The last class was an indefinite class, which numbered 8,512,706. The method of research adopted with the industrial classes was to obtain the causes of illness or injury apart from the causes arising from their trade or calling. He had found that a large number of working men were very fond of attributing their maladies to what they called their work, but there were five causes of degeneration apart from their calling, of which the principal was intemperance; and the tables of statistics showed that the per-centage of death amongst the class of persons who were engaged in the traffic of intoxicating liquors was the largest. Among other disturbing influences among the working classes, the lecturer instanced and described the food supply, the hereditary proclivity to disease, poverty, and inattention to cleanliness.

In the second lecture Dr. Richardson said that during the previous week he had been enabled to peruse the facts regarding the whole of the sixty-nine occupations recognised by the Registrar-General. Twenty-five of them were of a vitality above the average, while forty-four were below. The chief sources of injury to the human system by industrial labour might be classified into eight divisions, viz.:—I. Inhalation by the lungs of (*a*) fine particles of solid matter, *i.e.* dust, (*b*) noxious gases, and vapours; II. exposure to soluble chemical substances; III. mechanical impact of foreign bodies; IV. physical injuries from (*a*) unnatural postures, (*b*) sustaining and bearing loads, (*c*) undue atmospheric pressure, (*d*) mechanical concussion; V. exposure to damp and to impure air; VI. contact with organic parasitic forms; VII. excess of muscular work; and VIII. variation of temperature. In enumerating these various sources of injury, the lecturer incidentally mentioned, under the fourth head, section *a*, the postures assumed by miners and others, and in reference to section *c* of the same heading, he remarked that the triumphs of modern engineering were not without drawbacks, one of which was the creation of a new form of disease, which had been called by Dr. Smith, of New York, "caisson disease," inasmuch as it was very prevalent amongst men who worked in caissons under a pressure of three or four atmospheres. Under section *d* of the same heading was to be classed a peculiar disease to which carpenters were subject, owing to the concussion caused by the use of the plane to the minute blood-vessels of the neck and chest. A similar disease was also common to the boys who had to go inside boilers to hold the rivets while they were being secured by the hammermen. Butchers were subject to the causes of ill-health mentioned under the fifth and sixth heads, exposure to impure air, and contact with parasitic forms existing in the bodies of animals slaughtered for food. Under the last heading, variation of temperature, engine-drivers were, perhaps, the greatest sufferers. Proceeding to discuss in detail the sources of disease from the causes enumerated under the first section of the first heading, viz., inhalation by the lungs of fine particles of solid matter, he said the trades in which the most suffering from this cause was felt were twenty-five in number, and included file and saw-making, knife-grinding, needle-making, stone-cutting, lime-burning, wood-turning, wood-sawing, ivory-turning, woollen, cotton, and flax manufactures, paper-staining, artificial flower-making, tobacco and snuff manufacture, and flour-grinding. In every one of these occupations the lungs of the work-people were subject to the inhalation of fine particles of matter, more or less unhealthy, according to the nature of the occupation followed. By means of the *cilia* attached to the upper surfaces of the air-vesicles of the lungs, Nature had made an efficient provision for the expulsion, by means of the bronchial secretion, of particles of dust and foreign matter inhaled in the ordinary course of life; but so delicate were these *cilia*, that they were unable to perform their duty efficiently when they had to cope with the abnormal quantity of foreign particles which was inhaled by workmen engaged in such trades as those mentioned. Consequently, the particles settled on the lungs, and disease, more or less remote, according to the nature of the particles inhaled, was engendered. The greatest danger occurred

when the particles inhaled were of steel, stone, sand, or glass; for these, besides being insoluble, were finely edged or pointed, and their settlement on the lungs produced an irritation, or inflammation, which speedily developed into pulmonary consumption, which was an especial scourge of the knife-grinder, stone-cutter, and glass-paper maker. The Sheffield grinders were great sufferers from the injurious effects of fine particles of steel on the lungs. It had been questioned whether pulmonary consumption induced in this manner could become hereditary, and although he (Dr. Richardson) was not prepared to say, the indications seemed to favour an affirmative. This, however, was a refined question of pathology, which had yet to be authoritatively decided; but it was a most important one, for it would be sad indeed if large classes of men, in the ordinary course of their daily vocations, were inducing disease which they would transmit to their offspring. First, then, the inhalation of small particles of solid matter produced pulmonary consumption, perhaps hereditary. Secondly, wood-carving and turning, especially mahogany turning, caused the workmen to inhale a very fine kind of sawdust, which was productive of chronic bronchitis. Ivory-turning induced the same complaint, but in a lesser degree. The dusts arising from textile fabrics varied greatly in their effects upon the lungs of the workers. The fluffy particles of wool appeared to cause no evil effect upon the lungs,—a circumstance attributable to the oil contained in the wool. The fluff of silk was almost equally harmless, although, in silk-trimming manufactories, Dr. Richardson said he had found the workers suffering from the same kind of bronchial irritation as that induced by the dust of wood; this was solely due, however, to the dyes with which the material had been coloured, especially when the red and other bright aniline dyes had been used. The fine particles which were given off by flax and hemp in the course of manufacture were very different in their effect, being much more injurious than those arising from wool and silk. The dust of hemp (which lost greatly in weight in the process of manufacture, for out of every 112 lb. weight, 4 lb. were lost in the shape of dust) was particularly injurious, causing great bronchial irritation. The dust of both Russian and Polish hemp had this effect, but the Neapolitan hemp was worse than either, for, combined with it was a plant the dust of which produced shortness of breath and the symptoms generally accompanying what was commonly known as hay-fever. The collection of rags,—a business largely carried on in London and all large centres of industry,—engendered the same kind of disease, but, contrary to what would be the natural and general expectation, seeing that rags were very frequently derived from infected clothing and the bedding of sick-rooms, it was not found that epidemic diseases were specially rife among those engaged in the rag trade, although the odour emitted from a rag-store was generally very offensive. Careful inquiries had been made on this point in Edinburgh and elsewhere, but the only disease to which rag pickers and sorters appeared to be subject was chronic bronchial affection, caused by inhaling the dust from the rags. The dust from corn, consisting principally of residue in the shape of dried husks, was rarely present in sufficient quantity to produce much irritation, but the dust of flour, though not injurious when inhaled in small quantities, was very detrimental when much of it was inhaled, causing great difficulty of breathing, and producing the third disease he had to name, —asthma [and emphysema. The dust arising in earthenware manufactories from clay or silicious material gave rise to a disease known as "potters' asthma." In the burnishing of metal much bronchial irritation was produced by the finely-powdered rouge which was employed to give a polish. In some stages of paper-staining, and in artificial flower-making, the arsenical powders largely employed resulted in gastric irritation and dyspepsia among the workers. Fur-dyers were subject to caries of the teeth, but this was much more the case fifteen years ago, improved mechanical appliances having greatly ameliorated the condition of the workmen in this respect of late years. The dust arising from tobacco-leaves during their manufacture into cigars was particularly irritating, charged as it was with the volatile properties of the weed. Even more injurious was the dust produced by the various processes of snuff-making, for the tobacco dust was mixed with ground lime, sawdust, salt and water, and made hot. Workers in the tobacco trade were particularly subject to nervous depression. The inhalation of particles of fine carbon was very injurious to the lungs of coal-miners, their lungs having sometimes appeared to be carbonised, although carbon was less destructive of the tissue of the lung than particles of glass, &c. Walking-stick makers suffered greatly from the inhalation of powdered carbon in the process of preparing and polishing their sticks after they had been charred. Passing to section *b* of the first heading of his subject, Dr. Richardson remarked that the inhalation of noxious gases and vapours was even more injurious than the inhalation of solid particles of matter, for the *cilia* attached to the entrances to the air-vesicles of the lungs were at all times utterly powerless to arrest the passage of gases to the lungs. The inhalation of noxious gases and vapours had a twofold action: firstly, a direct local action on the bronchial tracts; and, secondly, a general or constitutional action through the blood. The vapours of nitric acid, turpentine, bisulphide of carbon, and copper smoke were particularly injurious; indeed, any noxious gas or vapour, if inhaled for long periods, would soon prove fatal. Carbonic oxide gas, the product of the imperfect combustion of carbon, was most injurious in its effects, producing diabetes, which was very prevalent amongst those who were in the habit of burning coke in close rooms or workshops, tinkers and braziers being especial sufferers. Frame-lace makers also suffered in the same way when, as they sometimes did in cold weather, they placed dishes of burning coke under their frames to keep their hands warm; their heads being directly over the pans of incandescent fuel, they inhaled the fumes, which produced vertigo. The fumes of sulphuric acid, as used in the bleaching of straw for bonnets, &c., were very injurious, producing undue thinning of the blood, which resulted in anæmia. In conclusion, Dr. Richardson said that the late Professor Graham, who had given much attention to the laws of the diffusion of gases, was of opinion (and that opinion was generally shared by scientific men) that in the probably not-distant future the condition of various classes of workmen whose vocations compelled them to inhale noxious gases and vapours, would be materially ameliorated by the discovery of some simple means of separating gases one from another with the greatest facility.

In the third lecture, Dr. Richardson, in resuming his discourse on the detrimental influence of foreign particles when introduced to the throat and chest, by the process of inhalation, said that pearl dust, as produced in the manufacture of ornaments, was injurious to the worker, as the particles given off were of a peculiarly sharp and cutting character. Speaking of sulphur and sulphurous acid, he mentioned the disease of ophthalmia sustained by those engaged in getting rid of parasitic insects on the leaves of vine and other plants by the use of sulphur. In the process of hat-making a solution of ammonia was used, and in this work, as well as in other occupations in which ammoniacal vapours were encountered, a thin and fluid condition of the blood was produced in the veins of those engaged. The vapour of turpentine, as used in the trades of painting and varnishing, produced very marked symptoms of disease by its effect upon the blood, the most complaints induced being constipation and dyspepsia. In the process of waterproofing by means of indiarubber, the volatile vapours given off by the bi-sulphide of carbon employed had a severe effect upon the nervous system, and the worker was sometimes reduced to a state of mental and bodily depression which was almost indescribable. The fumes of resin also, as breathed by workers in brushmaking, produced much throat irritation. Passing to the fumes given off by acids, he first spoke of nitric acid, and the vapour produced by this acid and inhaled by workers at fur-cleaning and other trades produced a coagulation of blood which had most injurious effects and led to many diseases. Many other gaseous bodies were most detrimental to those who were compelled to inhale them at their ordinary employment. The workers in the aniline dye manufactories suffered much from the vapour given off the aniline, and were often attacked with insensibility and a peculiarly violent form of neuralgia, which ended in ulceration. Aniline and other substances used in the modern processes of dyeing were strong poisons. The vapours from metals evolved in the processes of smelting and subliming were in reality very fine particles of metal itself, and produced a destructive corrosive effect when inhaled. The vapours from copper, mercury, zinc, and lead, were the principal ones met with in manufactories, and, strangely enough, the smoke or vapour from copper has been proved to be of service in arresting the progress of an epidemic disease. Excessive salivation and ulceration of mouth were the principal diseases brought on by the inhalation of mercury, although very frequently neuralgia and decay of the teeth were induced among the workers in that metal. Rheumatism, and a complaint known as mercurial tremors, were other forms of disease to which they were liable. The fumes of oxide of zinc were often productive of nausea and a choleraic disease. He also referred to the diseases so common ten or twelve years ago among the workers in phosphorus match factories, namely, the peculiar decay of the jaw-bone. This was now happily almost extinct in this country, owing to the improved processes of match-making. Passing to the diseases induced by the exposure to chemical substances, he proceeded to speak of lead, the particles of which were usually encountered by painters and earthenware makers, lead being used for glazing in the latter occupation. Lead-poisoning was too often brought on by the want of cleanliness in the artisans, who frequently took their meals without first washing their hands, and from this cause received the particles of lead directly into the system. The poison usually first took effect upon the kidneys, and induced an inflammation there which was an early stage of the disease. Paralysis in the more severe cases then set in, and this usually attacked the hands and arms, the extensor muscles being paralysed, and producing enfeeblement, and often total loss of power, upon the worker. In the case of poisoning by this agent the lead spread itself all over the body, and produced various organic changes. The tissues and muscles gradually contracted, and this at length affected the action of the heart, and death then ensued. Since the days when firearms had been first invented a nodule of lead had been the messenger of death to many a man, but few persons would credit the number of working people who had been killed by the insidious and stealthy diseases brought on by lead poisoning. The fact that those engaged in occupations in which lead was used died at the rate of 38 per cent. above the average rate of mortality showed the dangers to which such persons were exposed. The diseases incurred were, too, of an hereditary nature, for it was noted that the children of lead-workers in many cases died at an early age, or were of a weak and sickly nature.

The next lecture will be delivered on the 21st inst.

NEW BATHS AND WASH-HOUSES FOR GLASGOW.

ADEQUATE public accommodation for placing within reach of the masses of this large city the means for personal and domestic cleanliness unfortunately exists but on a very limited scale, and the tardiness of the Police Board (which is the local authority in such matters) in recognising the need for such elements in social amelioration may well occasion surprise. True, that in most of the better-class houses baths are fitted up, and that private enterprise has otherwise provided for the wants of the well-to-do section of the community, but the working classes have hitherto had to content themselves with such accommodation as is afforded by the existing baths in London-road, or with those portions of the river Clyde above the bridges which are set apart for bathing purposes. Chiefly owing, however, to the labours of Councillor William Wilson, who has recently been returned as a member of the Police Board, a committee has been appointed with a view to remedy this anomalous state of things, and the first result of their labours is the preparation of plans, which will secure for the populous east end conveniences for cleanliness exceeding those which they have hitherto enjoyed. The first part of the scheme includes the reconstruction and enlargement of the present baths in London-road, and the erection of new baths and wash-houses on the Green in lieu of the existing dilapidated and unsuitable washing-house at the corner of William, Calton, and Greenhead streets. The old structure will shortly be demolished, and new buildings erected with a view to meet the requirements of this portion of the city. The new premises, the plans of which have been prepared by the master of works, will have a high elevation east and south, the style being Classic in design, with a frontage of 148 ft. to the Green, and 118 ft. to William

and Greenhead streets. The eastern division of the building will be set apart for bathers, the western portion being intended for clothes-washing purposes. There will be an entrance to each department from the south frontage to the Green, both being commanded from the superintendent's office. The large swimming-bath will be 84 ft. long by 45 ft. broad. The dressing-boxes, to the number of about 100, are to be carried round the pond, the lighting, as is usual in such cases, being obtained entirely from the roof. Enamelled and other tiles will be used in the construction of the large swimming-pond and of the internal lining of the main walls. Occupying a site at the northern end of the large bathing-hall will be lavatory and other conveniences, with several private bath-rooms, and it has been suggested that the introduction of suitable gymnastic apparatus would add to the usefulness of the new establishment.

But the clothes-washing section of the new premises will probably be its most important feature, especially when it is remembered that in connexion with a large number of the poorer class of houses in the city, the accommodation for carrying out this necessary portion of household economy is very imperfect. Provision has been made for thirty washing-stands, divided into separate compartments. The arrangements in connexion with each will consist of three tubs for steeping, "graithing," and wringing; hot and cold water-taps, and also a drying-stove; the moisture and steam being carried off by means of a flue passing along the top of the boxes. By this means also a proper system of ventilation will be secured; while the system of drainage has been devised on the most approved principle, and a room is to be provided and furnished where the women may dine or rest themselves during the day. The superintendent's house will occupy a position at the south-west corner of the main building. A part of the scheme which will be appreciated by numbers of persons who ramble on the Green will be the proposition to erect an iron verandah along the eastern half of the south front and the entire length of the east front to Greenhead-street, underneath which is to be placed a number of seats.

The alterations in the London-road Baths include the extension of the swimming-bath, so that its dimensions shall be—length, 65 ft., and breadth, 30 ft.; and, as in the case of the new bath at the Green, the depth will be from 4 ft. at the most shallow to 7 ft. 6 in. at the deeper end. The dressing-boxes will be re-arranged, and by utilising the space in the upper story of the building, the number of private baths will be increased from about a dozen to twenty-six, while there will be corresponding improvements not only in the fitting up of these, but throughout the whole building. On a piece of ground on the western boundary of existing buildings it is proposed to erect a washing-house capable of division into thirteen or fourteen compartments, after the style indicated above. The alterations at London-road are to be proceeded with immediately, while the larger and more important undertaking on the Green will be commenced when all the preliminaries have been arranged.

ST. AUSTEN'S COLLEGE, NEW KENT ROAD.

A BUILDING bearing the above title, situated on the south side of the New Kent-road, near the Elephant and Castle, has just been completed, and formally opened. It is intended for the training, and also as a residence, of students and lay preachers in the Church of England, of whom it will accommodate upwards of forty. The Rev. George Nugée, M.A., formerly vicar of Wymering and rector of Widley, Hants, is the provost and principal of the college. For the purposes of the institution three large houses were purchased, together with upwards of an acre of land adjoining. The buildings have all been thrown into one, and converted into an edifice of a decidedly ecclesiastical appearance. They have been partially reconstructed externally and internally, so as to adapt them to their intended purpose. The elevation to New Kent-road is Gothic, and at the east side an entirely new structure, called the College or Priory Chapel, has been erected. The New Kent-road frontage has two lofty double traceried windows, and it is surmounted by gables. A square tower and turret rises upwards of 80 ft. above the roof of the chapel. The interior has a decorated vaulted ceiling, and at the west end is an organ-gallery, with a carved front. At the rear of the chapel, overlooking the recreation-ground attached to the establishment, a large dining-room has been erected. The building is enclosed by a lofty boundary-wall, facing the New Kent-Road, in the centre of which is a spacious Gothic doorway and entrance, surmounted by a gable 20 ft. in height, all being in carved and moulded stone. Enclosed within the gable over the entrance, in a sitting position, is the sculptured figure of a bishop, holding in his hand the episcopal pastoral staff, with the inscription underneath "*Domus servorum Christi.*"

Mr. Norton is the architect, and Mr. Ransom, of Walworth, the builder.

PROPOSED CHANGES, ROYAL INSTITUTE OF BRITISH ARCHITECTS.

SIR,—The meeting to be held by the Institute on Monday, the 10th of January, for the consideration of the recommendations of the committee on the reconstruction of the Institute, is the most important one since its foundation. The report of the committee involves not only an entire remodelling of the whole framework of the Society, but the admission of a class of membership that will destroy its present distinctive professional character. It will mix up the tradesman with the body, and instead of continuing to be a purely artistic, scientific association, it will have a commercial element, which it was *the purpose of the founders to avoid.* By dissociating the architect from the builder it was sought to remove the corrupting influences, which, however they may profit the individual, imperil his character, sacrifice the interest of the employer, and degrade the profession. Hereafter, if the recommendations of the committee are accepted, the great object of the honourable man who respects his own personal character and the prestige of the profession must be to keep aloof from such a mongrel combination. Greater activity in the Institute and further judicious aids to students are very desirable; but they may be realised without sacrificing the great charter of the profession, as it now exists, and which maintains, as much as possible for any human composition, the moral, artistic, and intellectual position of the architect.

There are many other objectionable propositions, which, however embarrassing in carrying out to such a body, are not discreditable to the profession, but must be modified. But the great contaminating trade element is the first important blot. The principles of the present great charter of the profession must not be trifled with in order to create a new "Architectural Building Union" (unlimited).

Let us stand by the charter!

THOS. L. DONALDSON.

THE INSTITUTION OF CIVIL ENGINEERS.

ACCORDING to the report read at the annual meeting held on the 21st of December, the council have, during the past year, devoted much attention to the subject of the classification in the institution of the younger members of the profession, and arrived at the conclusion that it was desirable to create a new class, in order to distinguish between those who were engaged in the active pursuit of civil engineering, and those who were not so engaged; but as the mode in which this alteration should be carried out was found to involve some technical questions, it had not yet been possible to prepare a definite recommendation. The students attached to the institution, of whom there were now 328, being an increase of 46 since the last annual meeting, had been assembled at twelve supplemental meetings, exclusively for the reading and discussion of papers furnished by members of their class. The council expressed regret that these meetings were not better attended, and that the discussions were not equal to those of previous sessions. With respect to the financial position, it was stated that the income proper had amounted to 8,053*l.* 8s. 11d.; the receipts from admission fees, &c. (required by the bye-laws to be added to capital), were 2,114*l.* 3s. 6d., and from trust funds 456*l.* 6s. The general expenditure had reached 4,917*l.* 3s. 10d., while the disbursements for publications were 3,101*l.* 17s. 4d. The trust funds were of the nominal or par value of 14,171*l.* 0s. 6d., the Institution investments of 20,876*l.* 1s. 8d.,—together, 35,047*l.* 2s. 2d.

CHURCH OF ST. AUGUSTINE, BERMONDSEY.

THIS church is now in course of erection in the Lynton-road, South Bermondsey. The Mission district in which it is situated was originated by the late Bishop of Winchester in the year 1872, when the Rev. Malcolm Mac Coll was appointed curate in charge.

The first stone was laid by Mr. Philip Cazenove on the 27th of July last. The site was given by Mr. J. Allen Rolls, of Monmouth, who is a large landholder at Bermondsey. Owing to the ground on which the church is built being considerably below the level of the road along the north side, and the soil being peat for some depth, it was thought desirable to form a crypt under the whole of the building.

A groined ceiling has been constructed of cement concrete at a height of 14 ft. above the floor of the crypt, and this forms the floor for the church.

The chancel, which is now nearly completed, is 40 ft. deep and 27 ft. wide; it will be vaulted with red brick to a height of 46 ft. Chancel aisles, 5 ft. wide, extend round three sides; the portions adjoining the western bays of the chancel on the north and south sides are 13 ft. wide, in which seats will be placed.

The organ gallery is on the north side, under the tower. The vestries will be on the north side of the chancel; that for the clergy will adjoin the chancel aisle, that for the choir will be in the crypt below, reached by the turret stair.

The nave will be 77 ft. long, in five bays, 35 ft. high to the wall-plate, with a narthex 17 ft. wide, and a large porch facing the road. The font will stand in an octagonal baptistery at the south side of the narthex.

The walls are faced with red brick, with masonry of Bath stone and red Dumfries stone piers. The nave will be the same height and width as the chancel, with aisles 13 ft. wide and 13 ft. high to the wall-plate.

The church will seat about 900 adults, and will probably cost about 12,800*l.*, exclusive of the steeple; the whole of the seats will be free and open.

The chancel is now being built by Mr. Shepherd, of Bermondsey New-road, under the superintendence of Messrs. Henry Jarvis & Son, of Trinity-square, Southwark.

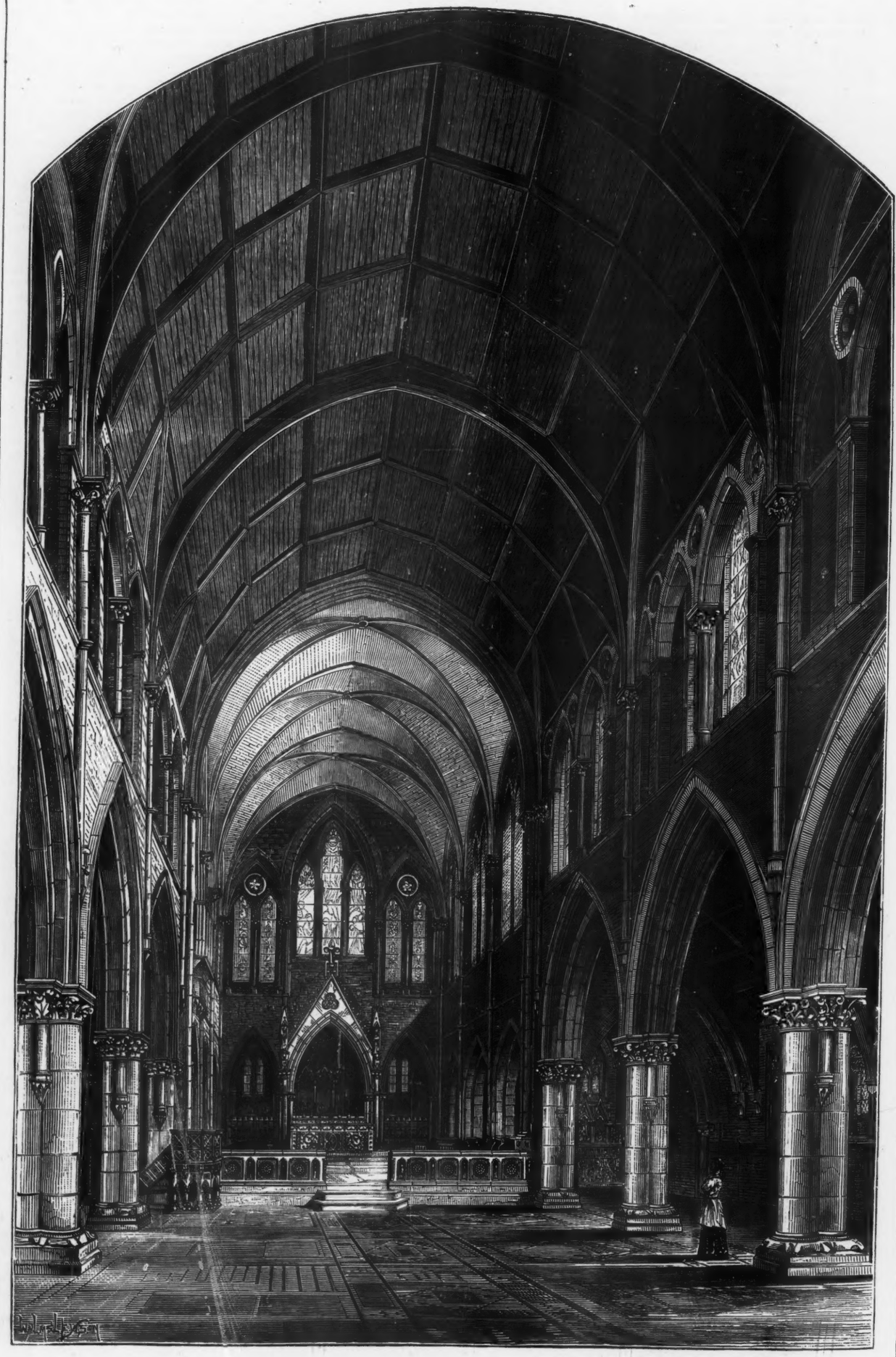
THE HALL OF THE UNIVERSITY OF BOMBAY.

WITH the permission of Government, we illustrate the Sir Cowasjee Jehangier Hall of the University of Bombay, which has been built on the esplanade, facing Back Bay. It was designed by Sir Gilbert Scott, R.A. The architecture is French Geometrical of the fifteenth century. The hall is 104 ft. in length by 44 ft. in breadth, with a height of 63 ft. to the apex of the groined ceiling, with a semicircular apse of 38 ft. diameter, separated from the hall by an imposing arch, occupying a space of 7 ft. in the length of the building. The front corridor is 11 ft., and the side corridor 8 ft. broad in the clear. There is a gallery round three sides of the hall, 8 ft. in breadth, supported on ornamental iron brackets, and reached by staircases in octagonal towers at either side of the entrance-porch. The facing is of Coorla hammer-dressed rubble, in courses of 5 in. in depth. The plinth is chisel-dressed Coorla; bases, capitals, cornices, and all other dressings of Porebunder stone; shafts of blue basalt, except in the main entrance, where they are marble. The groining is of Porebunder stone, a calcareous sandstone in shallow courses; the floors are paved with Minton tiles; and the roof is covered with the Broomhall Tile and Brick Company's patent red roofing-tiles.

The work was under the immediate superintendence of Rao Saheb Muckoord Ramchundra, assistant engineer. The estimate amounted to rs. 415,804 (of which Sir Cowasjee Jehanghier, K.C.S.I., contributed one lac).

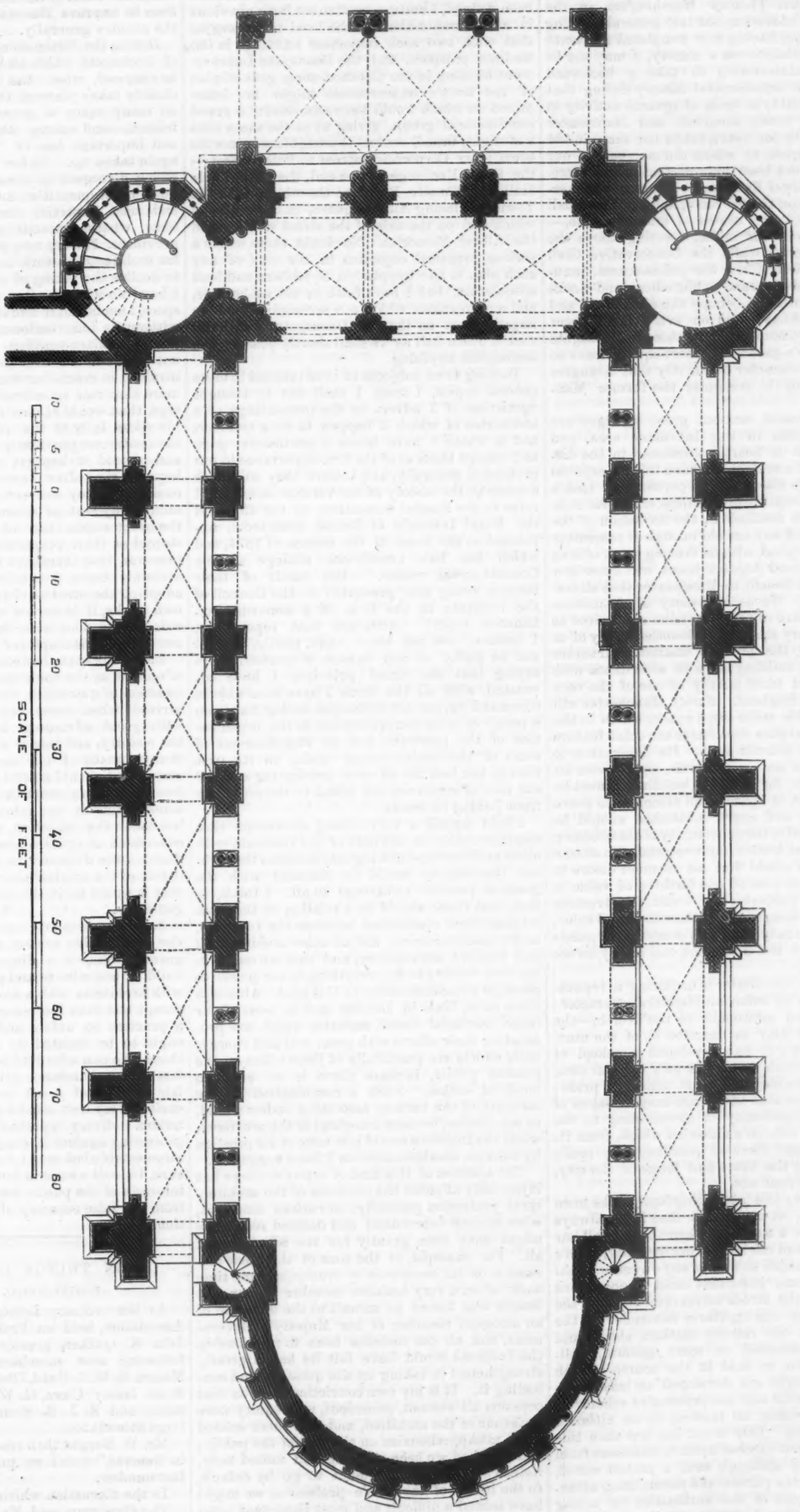
The actual cost has been 688,022 cubic feet (cubical contents above ground being alone taken) at 8·8 annas = 1s. 1d. per cubic foot, = 37,268*l.*

The Works of the Late Frederick Walker, A.R.A.—An exhibition of the works of the late Frederick Walker, A.R.A., will be opened on the 11th inst., in the rooms of the Society of French Artists, in Old Bond-street. The possessors of works by the artist are invited to contribute.



CHURCH OF ST. AUGUSTINE, BERMONDSEY.—MESSRS. HENRY JARVIS & SON, ARCHITECTS.

THE SIR COWASJEE JEHANGHIER HALL OF THE UNIVERSITY OF BOMBAY.—SIR G. G. SCOTT, R.A., ARCHITECT.



THE HALL OF THE UNIVERSITY OF BOMBAY.—*Plan.*

AN ARCHITECTURAL ADDRESS IN MANCHESTER.

THE president of the Manchester Society of Architects, Mr. Thomas Worthington, in the course of an address at the last general meeting said,—Perhaps, having now completed the tenth year of our existence as a society, it may not be altogether uninteresting to take a backward glance at our architectural history during that period. Probably a term of greater activity in building has rarely occurred, and Manchester has, during the ten years, taken her share in the work of progress, to which the members of our society have not been unimportant contributors.

Our new Royal Exchange,—the centre of mercantile life,—on the one hand, and the Town-hall on the other,—the centre of municipal life,—have risen up in our midst, towering above the roofs of the city; while the Conservative Club and the Reform Club, the police-courts, innumerable warehouses and public offices, and works of minor importance, occupy the sites of old and decayed buildings; and on every hand great street improvements, such as those in Deansgate and St. Mary's-gate and Albert-square, have so changed the character of our city that strangers find it difficult to recognise the former Manchester.

At the present moment great changes are in contemplation in the Infirmary area, and public interest is heartily awakened in the discussions on this subject. I have felt an especial interest in this discussion, as personally I took a very active part in the proceedings of several committees, which resulted in the formation of the esplanade; and any one old enough to remember the Infirmary pond, with its floating scum of soot and dead cats and dogs combined, will know how great a public benefit to Manchester that alteration effected. We as a Society of Architects cannot but share in the discussion now raised as to the Infirmary square, and doubtless many of us desire to see the present inartistic structure replaced by a building more in accordance with the times, and more worthy of one of the very finest sites in England. Surely Manchester will never suffer this noble open space, which in the eyes of all strangers constitutes the chief feature of the city, to be built upon. Its importance to the citizens as an air-reservoir, apart from its value as a site for a noble building, cannot be over-estimated, in spite of all attempts to prove the contrary; and every inhabitant should be willing and glad of the opportunity of contributing towards a great town's improvement. No citizen of Manchester would for one moment desire to deprive the sick poor of one farthing of value in the Infirmary property, nor would the trustees be justified in accepting less than its actual value, but there are many legal and complicated points involved before the discussion can finally be set at rest.

Meanwhile, Manchester is acquiring a reputation as a town of some architectural character; it is the inland metropolis of the North,—the Florence, if I may so describe it, of the nineteenth century; it has developed a school of architecture which we may largely call our own, and in which we may take a not unnatural pride; and let us hope that advantage may be taken of so rare an opportunity of contributing to the beauty of our town in a situation which, from its commanding and elevated position, may really be regarded as the heart and lungs of the city, as well as its finest site.

Before leaving this interesting topic of the town improvements, let me observe that it has always seemed to me a matter of regret that in all our large towns—and not least in our own city, where it is hardly possible to turn in any direction without finding some important building operations in progress—the street improvements and the changes in the thoroughfares demanded by the approaches to our railway stations should not have been conducted on some general, well-considered plan, so that in the course of each decade we might see developed at least some portions of a wide and comprehensive scheme of architectural lines, all tending to an ultimate complete result. This is not the first time this subject has been touched upon in addresses from this chair; and although such a project would, doubtless, involve patient and unremitting attention on the part of the authorities for a long course of years, yet with so excellent an aim in view, and a good plan to work upon, our municipality might, I feel certain, accomplish results which at first sight might seem Utopian.

During frequent visits to Continental towns, this idea has often forced itself on my mind; and in 1865, the year of the foundation of our Society, when the then contemplated new Royal Exchange and Town-hall were already under discussion, but before the actual building lines had been defined, I endeavoured to set forth my views in a communication to the local press, urging that with two such important buildings in immediate prospect, and the Deansgate Improvement looming in the distance, some general plan of the town's improvement might be determined on which would have admitted of a grand architectural group, giving us at the same time a straight, broad, central thoroughfare across the town from Corporation-street to Peter-street,—the Royal Exchange at one end, the Free Trade Hall and Theatre Royal at the other; with the Town-hall facing Albert-square, in the centre of which and on the axis of the street would stand the Albert Memorial. No doubt there exists a serious practical objection in the way of any such plan in the temptation to jobbers and land speculators, but I have faith in our authorities, and a corporation which can accomplish such an improvement as that in Deansgate, and build such a Town-hall as we shall shortly possess, can accomplish anything.

Turning from subjects of local interest to more general topics, I trust I shall not be thought egotistical if I advert to the proceedings of a committee of which I happen to be a member, and in which I have taken a not inactive part, as I regard them as of the first importance to our profession generally, and believe they will mark a crisis in the history of our various societies. I refer to the Special Committee on the affairs of the Royal Institute of British Architects, appointed at the close of the session of 1874, and which has held twenty-one sittings at the Conduit-street rooms, — the result of their labours being now presented to the Council of the Institute in the form of a somewhat exhaustive report. Although that report has, I believe, not yet been made public, I shall not be guilty of any breach of confidence in saying that the broad principle I have advocated, with all the force I have been able to command during our prolonged sitting, has been a policy of wide comprehension in the organisation of the Institute, and an abandonment of some of the exclusiveness which in its past history has had the effect of preventing some of our men of eminence and talent in the provinces from joining its ranks.

I hold myself a very strong conviction that common action on the part of the Institute with other architectural and cognate societies throughout the country would be attended with the greatest possible advantage to all. I think, in fact, that there should be a relation of the most intimate kind established between the Institute, as the parent Society, and all other architectural and kindred associations, and that we ought in our own Society to do everything in our power to promote a common action of this kind. Although there exist, both in London and in most of our large provincial towns, societies which are prosecuting their efforts with great zeal and energy, their efforts are practically of little effect on the general public, because there is no common bond of action. Such a combination of the strength of the various associated bodies would, in my opinion, be most beneficial to the provinces, while the Institute would lose none of its prestige by such an amalgamation as I have suggested.

The absence of this kind of *esprit de corps* has injuriously affected the interests of the architectural profession generally, on various occasions, when a more determined and decided resistance might have been greatly for the advantage of all. For example, at the time of the great discussion on *the ownership of drawings*, some time back, when a very eminent member of our profession was forced to submit to the dictation of an arrogant member of her Majesty's Government, had all our societies been in relationship the Institute would have felt its hands greatly strengthened in taking up the question and contesting it. It is my own conviction that on that occasion all custom, precedent, and equity were in favour of the architect, and that there existed great misapprehension on the part of the public; and that had we been a strong and united body, itstead of allowing judgment to go by default, to the injury of the whole profession, we might have settled a difficult and most important point which has long been and continues to be in dispute. I think that we, the Manchester Society of Architects, ought not to be behind-hand on such an occasion, but rather that we should be in the van, when a step may be taken for the general welfare of our profession; and though we are not a numerous body, I believe a hearty co-operation on our part might materially strengthen the hands of those who desire to widen the basis of the Institute, and at the same time to improve the status of the architects of the country generally.

During the forthcoming spring the Conference of Architects, which took place last in 1873, will be renewed, when the discussions which have already taken place at the previous conferences on many topics of general interest to our profession,—and among others that most difficult and important one of "Quantities,"—will be again taken up. On few subjects are there more widely divergent opinions among us than on this question of quantities, and it deserves the fullest and most impartial consideration of all architects, whether practising in London or in the provinces. For my own part, a strong preference for architectural work has induced me, as a rule, to decline the taking of quantities; but although I have no wish to alter my practice in this respect, I am bound to admit that it is not altogether without its inconveniences, to say nothing of the large pecuniary sacrifice. The architect who does not take out his own quantities is undoubtedly involved in much increased labour, in preparing more elaborate specifications and detailed drawings, than would otherwise be required to explain his views fully to the quantity surveyor and to the contractor previously to obtaining estimates; and should it happen, as it sometimes does happen, that after plans so prepared have been completed they are set aside, it is difficult to obtain any sort of reasonable remuneration for the great expenditure of time and thought bestowed on their preparation. It appears to me, however, that there can be no impropriety, and certainly some convenience, in an architect adopting the practice of taking quantities for his own works, if it be his wish to do so, and provided it be done with the knowledge and concurrence of his employer.

There has been, however, so much divergence of opinion at the conferences on this much-vexed question of quantities, that I think the time has arrived when some recognised system might with great advantage be adopted throughout the country, and that it would be most desirable that as many of our members as can make it convenient should attend the forthcoming conference, and represent their views in the discussions on this or any other topic. The Institute has taken the initiative, and invited the fullest expression of opinion from all, and is, I have no doubt, quite disposed to entertain some modification of the original charter, should it be shown that it would be in the interest of the profession generally. * * * *

A very serious evil sometimes accompanying the competitive system, and which is, I fear, a growing one, is a disposition on the part of building committees and public boards to bargain with architects with a view to inducing them to accept less than the recognised scale of charges, a practice so unfair and discreditable that it ought to be resisted by all, and especially by those who can afford to be independent. I confess such unhandsome attempts to diminish the fair earnings of a not too well paid profession excite in my own mind a strong feeling of indignation. Every opportunity should be taken of protesting against it, especially by the elder and more established men; and all of us must, I am sure, be well aware in how many ways the true interests of the public would be certain to suffer from the false economy of insufficient remuneration.

"ON THINGS IN GENERAL."

ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association, held on Friday, the 17th ult., Mr. John S. Quilter, president, in the chair, the following new members were elected, viz., Messrs. E. W. J. Dodd, Clapton Rolfe, A. Flowers, F. de Jersey Clere, G. W. Browne, W. B. Reynolds, and S. J. R. Smith. There was a very large attendance.

Mr. W. Burges then read a paper "On Things in General," which we printed *in extenso* in our last number.

In the discussion which followed,

The Chairman said Mr. Burges had treated a very comprehensive subject under three very pointed heads. The first topic he discussed had received very ample attention at the hands of the Association during the past session. The second had come before the meeting rather prematurely, perhaps, although it was a topic which had been

freely discussed, and on which a report had just been presented to the Institute by a special committee appointed to consider the subject. The third part of the paper, which dealt with the future progress of architecture, was one of vital interest to the profession.

Mr. J. P. Seddon said it had been a dream of his, especially during the time he was acting as secretary to the Institute, to see all the professional societies under one roof. With reference to the future of the Institute, he thought that if the report of the special committee which had been alluded to led the Institute to put forth a tangible programme of operations, on a sufficiently bold scale, it would command the support of the profession; any scheme of a vague and undecided character would fall to the ground in embryo. Mr. Burges's remarks as to the future of architecture, dealt more particularly with the education of the architect,—always an interesting subject. Undoubtedly the younger members of the profession were mainly indebted to the Association for the greater part of their education. The systematic manner in which the classes for the study of artistic and scientific subjects were conducted was admirably calculated to further the educational status of the profession.

Mr. T. Roger Smith said he agreed so fully with the views which had been so ably put forward by Mr. Burges that it was difficult to add anything, except to express the hope that it would not be eight years before Mr. Burges would again read a paper before the Association; indeed, it was possible, as things were moving so fast, what with railroads and new styles, that Mr. Burges would find it absolutely necessary to address the Association before another eight years had elapsed. It was impossible to look around the present large assemblage of gentlemen engaged in the study and practice of architecture, without feeling that the Association was really a great centre of architectural education,—a centre from which influences for good would eventually be conducted all over England, and through the greater part of the practice of the last quarter of the nineteenth century. If he might emphasise any particular portion of Mr. Burges's paper, it would be that in which he had shown that the art which he had studied so thoroughly and practised so well was not a mere trick of drawing, but the result of great labour, study, and thought. Young architects were too apt to consider that in drawing, their hand and eye were doing enough, and that they were released from the necessity of thinking and observation. This was not the case with painters or sculptors, and far less ought it to be so with architects, for architecture was a logical art, depending upon building, the nature of materials, situation, climate, the wants of man, and an infinite number of practical considerations, and it was only when a man had grasped all these, when he knew what were the capabilities of materials and workmen, that he was properly equipped for the carrying out of the artistic part of his profession. This was the reason why much of the best art of the world was done by men who had little or no notion that they were artists at all.

Mr. Phené Spiers said, that with reference to the "Queen Anne" style, which had been treated of in the first portion of Mr. Burges's paper, the Association had fully discussed it last session, and had fairly well "sat down on it." What must be looked upon as its chief source of danger was its adoption as a complete style which might be studied by young students. There were a great many young men beginning architectural work at the present time who had not had, and would not have, an opportunity of going through those serious labours which the pupil of twenty or fewer years ago went through in working up the principles of the Gothic style by measuring the old churches throughout the country. Neither would they have the opportunities offered thirty or forty years ago of learning carefully the proportions of the orders. Therefore they had no ground to stand upon. He thought the introduction of the "Queen Anne" style was to be looked upon as a very great misfortune, considered with reference to its effects upon the education of the young architect. He did not feel disposed to agree with Mr. Burges that the Gothic style was the best suited to this climate, for he considered that Classic architecture adapted itself to our requirements with far greater facility than Gothic. At all events, it possessed certain sound principles, the acquirement of a knowledge of which would be of lasting benefit to the student. As to the position of the Institute, there was no doubt that the Association had done very wisely in refusing to allow itself to become absorbed by, or even affiliated with, the senior body. The best way for the Institute to increase its influence and usefulness would be for it to take up the work which had been done, and was still being done, by the Association. The Association owed its success to the fact that it was an educational body, and until the Institute pursued the same course it would never assume its proper position. The committee which had recently presented their report on the affairs of the Institute hoped that the charter would be very materially altered, so as to bring the Institute more in consonance with modern requirements. At the time the charter was granted, there were only thirty or forty Fellows, while now there were about 400 Fellows, and perhaps 600 or 700 who might become Fellows under altered conditions. As to the excursions under the guidance of Mr. Edmund Sharpe, he thought that had Mr. Burges accompanied the Angoulême excursion he would have found that an incalculable amount of good was done, even though the stay in one place might be of very brief duration. The route was always so well chosen that the places visited were seen to the best advantage. While it was desired to see as much as possible during each excursion, it was hoped that the flying visits paid to many of the places would act as a whet or incentive to individual members to visit them at greater leisure in the future. In conclusion Mr. Spiers proposed a vote of thanks to Mr. Burges for his able paper.

Mr. Boyes, in seconding the proposition, said it would be matter for great regret if in the Association any sentiments in the least degree disloyal to the Institute were supposed to find favour. He was quite sure that whatever might be the management of the Institute, and however capable of improvement it might be,—and everybody knew that it *was* capable of improvements, and hoped that it would be improved,—the main body of the Institute was of the same view as the Association with regard to the advancement of the profession. It would certainly not be for the good of the profession if the two societies were to "fall out." He thought the Association could not do better than to in every way support the Institute, and by continually drafting the senior members of the Association into the Institute, and by the gradual development of a progressive spirit, the needful reforms would be effected, without even an apparent disruption between the two bodies. He thought that the proposal for amalgamation was somewhat prematurely brought before the Association. The Association's strong point was that it was perfectly capable of managing its own affairs, and although it had, perhaps, somewhat peremptorily refused to coalesce with, or be merged in, the Institute, yet the refusal was not due to any feeling of disloyalty towards the Institute. There should be no want of union between the two bodies, which should go forward side by side.

Mr. H. H. Statham said he agreed so very much with all that Mr. Burges had said that there was little to add. He had always been led to regard Mr. Burges as a kind of architectural Ishmael, whose hand was against every man's, and therefore he had been somewhat agreeably surprised at the moderate tone of the paper. With regard to the Institute, he could not but express his satisfaction with the remarks which had been made by Mr. Burges. There was some applause during the course of the remarks by the last speaker in favour of the Institute, but whenever "a cut" was made at the Institute the applause, he noticed, was much more lively. As to the kind reception of the Mediævalists by the Institute, it was greatly to be regretted that more of them did not attend the meetings of that body and take part in the discussions, for at every meeting the same gentlemen did all the speaking,—some of them spoke very well, and probably that was the reason why they were called upon to speak. He was much pleased with Mr. Burges's remarks about the importance of thought rather than mere drawing in building, for he thought the profession would be a much more real thing if less dependence were placed on the drawing-board and T-square, and if details were drawn on the spot, with the view of the better judging of their effect. In the present day there was far too much time spent in making elaborate drawings, which did not further the building in the least. He differed from Mr. Burges's opinion as to medals, for a medal was a testimony that its possessor had surpassed some one else in the race.

Mr. E. B. Ferrey said he was very glad to hear Mr. Burges's remarks as to the value of a knowledge of Greek art. It was too much the fashion to pooh-pooh anything that was not Gothic, but Greek, Italian, and even Indian architecture might be studied with profit. The value of foreign travel to the architect was very great, for the more he travelled the broader and more enlightened became his views.

Mr. Riddett thought the Association was somewhat in danger of being a little too much "patted on the back." During the past two or three years the general opinion had been that the Institute had not been as "good" as it ought to have been, while the Association had been held up as being a great deal better than the Institute. A great deal was said about the "enthusiasm" and "deep study" which were to be found in the Association: well, he only hoped that at the end of the session the enthusiasm in question would be found to have taken a tangible shape in the form of work accomplished in the classes. The classes had not grown with the growth of the Association; and he was afraid that the praise which was lavished upon the Association generally was not due to the classes in particular. Before "pitching into" the Institute,—which no doubt deserved a certain amount of "pitchment,"—the Association should first see that it had no beam in its own eye.

Mr. G. Elkington, jun., said that directly a new style or fashion set in, the mass of illustrations of it which were published, almost imperceptibly, whether for good or evil, led to a certain amount of eclecticism. Was this eclecticism to be sought after or avoided? Was there a possibility of excelling in two styles contemporaneously? Was it not possible for a "Queen Anne" house to exist side by side with a Gothic town-hall without any violation of artistic feeling?

Mr. S. Flint Clarkson said that all revolutionaries, no matter whether in art, politics, or religion, necessarily, in order to secure themselves a hearing, overstrained what, if they were moderate and temperate, would probably be their own inmost feelings as to the importance of the subject which they wished to put before the world. At any rate, they temporarily obscured any view of any other than the particular object which they wished to thrust forward. He ventured to think that the advocacy of Gothic architecture had been submitted to something very much like the same process. The advocates of the Gothic revival, after long fighting in what appeared to be a losing battle, maligned their opponents, and eventually conquered. When they had succeeded they became reflective, and began to think whether they had not crushed their opponents too hard. Gradually they became more liberal, and a great deal of enlightenment began to dawn on the Gothic school. Perhaps, therefore, Mr. Burges would be inclined to assent to the last speaker's suggestion that buildings in different styles might be allowed to exist side by side?

Mr. Burges: Certainly not.

Mr. Stannus said he understood Mr. Burges to say that one of the benefits resulting to the profession from the accession of the Mediævalists to the Institute was the adoption of the 5 per cent. rate of remuneration. He thought that the Institute was to be commended, if not on account of its medals, at any rate on account of the valuable book prizes which it distributed. As to the architectural examination, he believed it was about to be placed on a better footing. As to the subject of "things in general," it was to be regretted that Mr. Burges and other "fathers" of the profession were not more often heard thereon at the Institute and elsewhere.

Mr. R. P. Pullan agreed with Mr. Burges in thinking the "Queen Anne" style a retrogression. He also agreed in thinking that architecture should be more fully represented amongst the ranks of the Royal Academicians. He coincided with the views put forth by Mr. Burges and Mr. Ferrey as to the great advantage of a knowledge of Greek architecture, because the principles of Greek architecture were the principles of common-sense, and the principles of common-sense were the principles of all good architecture. In the first place, its proportions were exquisite. What was good architecture but good proportion? It was true that the disciples of the extreme Gothic school delighted in the irregular and the purposely "picturesque," but the great buildings of all ages were all designed in proper proportions, even to the detail, and not only was this the case with the Parthenon, but also with the Sainte Chapelle and Westminster Abbey. Another

great merit of Greek architecture was its construction. The temples were the best buildings of the Greeks, because they were devoted to religious purposes, for religion had always been the great moving power in all good art, whether in ancient Egypt, Greece, or during the middle ages. The Greeks built their religious edifices of the best materials, and in the best manner. On the contrary, our churches and other ecclesiastical buildings were constructed of a sort of coarse rubble work, as if in imitation of the construction of some Cyclopean wall, whereas they should only be constructed of squared stones, with fine joints in lieu of mortar joints ¼ in. thick. He noticed that Mr. Burges shook his head.

Mr. Burges: Very much so.

Mr. Tarver said that if the Greek work was guided by common sense, he supposed that if a Greek of the best period were to come to life in the present day, the kind of window which would appeal most to his common-sense would be the double-hung sash?

Mr. W. W. Robertson, with reference to Mr. Burges's inquiry why, if large sheets of plate-glass were used, they should not be confined to the bottoms of the windows, said that the portion of the room furthest removed from the window derived all its light from the upper part of the sash, which should, therefore, not be in any way obscured.

Mr. J. Sulman said he had found no difficulty arise from the division of the upper part of the sash into small panes. He thought it was possible to draw still further instruction from Mr. Burges. As to future progress, what course of procedure would he advise young architects to keep in view? Were they to confine themselves mainly to the practice of one style, whatever buildings they had to design? Or, considering the varied wants of the present day, would it not be best to work in various styles, or to become slightly eclectic, and, keeping one style as the general basis, endeavour to incorporate with it whatever might seem good in other styles? No one style seemed to suit equally well all wants. By "eclecticism" he did not mean the haphazard jumbling of incongruous fragments, but a judicious combination and modification of forms.

The Chairman put the vote of thanks to the meeting, and it was carried by hearty acclamation.

Mr. Burges, in reply, said he had engaged to give the Association one lecture, but they asked for two. He had never been asked so many questions before, and felt very much like Martin Chuzzlewit on the eve of his departure for America. As to the question of Gothic *v.* Classic, if by "Classic" were meant Greek, or even if Roman were meant, he would take off his hat to it,—although even the best Roman was bad enough. But what was ordinarily meant by "Classic" was the vilest Renaissance of George III.'s time. No; he (Mr. Burges) had been brought up in the thirteenth-century belief, and in that belief he intended to die. As to working in two styles, a man could never work in two styles equally well. Eclecticism, whether in architecture or language, would only result in a farrago. Indeed, "Queen Anne" might almost be called "negro-language." As to the affiliation of the Association with the Institute, his only object in suggesting its advisability was that affiliation would secure the advantages he had enumerated, although possibly there might be some attendant disadvantages. One speaker had objected to elaborate drawings, and had suggested the drawing of detail on the spot, but even by drawing detail on the spot it was very difficult to say what would be the effect of certain mouldings,—indeed, it was impossible to tell unless you had a piece worked up. Drawing things out on the spot was all very well when you had no contract, but for contract drawings almost everything ought to be put in. As to Mr. Sharpe's excursions, he adhered to the opinion he had expressed in the paper. He did not think such "scrambles" could result in much good; no doubt they were very pleasant affairs, but he should not like to take part in one,—it would be too fatiguing. He certainly had not meant to say that the "five-per-cent." scale was due solely to the Mediævalists; it was brought about by the combined efforts of both Pagan men and Gothic men. As to the Institute policy generally, it had been a great deal too vacillating, and a great deal too fearful of "putting its foot down." Had it been otherwise it would have been a great deal more respected.

The meeting then terminated. The next meeting will be held on Friday next, the 7th inst., when Mr. J. P. Seddon will read a paper on "Consistency and Refinement in Architectural Detail."

THE EDUCATION FOR AN ENGINEER.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

THE inaugural meeting of this Society for Session 1875-76 took place on Thursday evening, the 9th ult., when the president, Mr. W. F. Butler, A.I.C.E., read an inaugural address. The Society has now entered upon its seventeenth year, having been established in May, 1859, for the discussion of engineering and scientific subjects, since which date about 190 papers have been read, mostly followed by free and liberal discussion. Another important part of the Society's operations is the arrangement of visits to various works in progress and to manufactories, foundries, &c., in operation, by which means the younger members obtain an insight into practical knowledge. After stating that the Society had made arrangements for the publication, in the form of "Transactions," of the papers read and the discussions thereon, Mr. Butler proceeded to consider what was required of the young man about to enter the engineering profession, and by what means he might rise in his vocation. On these points he said,—As an engineer should be a man of no mean scientific attainments, so also he should have large practical experience. The first is evidently a question of education; the second, one of well-used opportunities during pupilage and practice. I think it may be said, without fear of contradiction, that the average English engineer, while excelling in the latter part of professional perfection, is as conspicuously deficient in the former; at any rate, this would be true of most during the earlier years of their career, for we all know by experience that as necessities arise we make ourselves more or less perfectly masters of the requisite theoretical knowledge wherein we may have been deficient. In most foreign countries special schools are established for the instruction of youths intended for the profession, and very admirable the course of study appears to be generally; nor can we doubt that the young man who passes successfully through one of these schools starts with many advantages, as far as theoretic knowledge goes, over the ordinary English pupil. Indeed, in some countries, the road to success is well nigh closed against the aspirant for engineering honours unless he bears in his hand the magic diploma of the Government school. We have most of us, I think, observed with pleasure what beautiful draughtsmen French and German assistants usually are, and how well-proportioned their work often is; but of the two systems, I believe our own, properly carried out, will be found superior. For while the foreign student in the school is learning to make drawings of canals, railways, harbours, &c., and the necessary works connected therewith, he has never, until in practice, either by himself or as assistant engineer, the opportunity of seeing his own or any other designs carried into execution, and while the drawings for a canal may be perfect, we cannot be sure that the work will be sound when filled with water. So also with railways and other works. In point of fact, the foreign student does at the schools pretty much what the English pupil does in his master's office,—the latter, however, while his theoretic training is less perfect, having generally the advantage of seeing a good deal of practical work as well. Now under the English system, as most people are aware, a youth goes into an engineer's office, not always because he has been specially educated or intended for the profession, but perhaps because his parents think he has a taste for mechanics, or for drawing, or because it is a "respectable" profession; and as they perhaps hardly know what to do with their "young hopeful," they imagine he may as well be an engineer as anything else. At any rate, his three years' pupilage "will keep him out of mischief." Now it is not of such as these that great engineers are made. I feel convinced that the best education a youth can have before he enters the office is such as that afforded by our public schools,—a good, sound, liberal education; while, if the student exhibits special aptitude for the study of science, and if his parents wish to make an engineer of him, his particular bent may be cultivated, and attention paid to his progress in mathematics, chemistry, geology, natural philosophy, and the application of science generally to engineering; and where, also, he may have the opportunity of forming friendships and acquaintanceships which will be of the greatest use to him in after life, for it is at public schools such as Eton, Harrow, Rugby, and others, that the intending engineer will meet with a number of young men whom, during his practice, he may again encounter as landlords, members of Parliament, magistrates, &c.; and only those who have had experience in the organisation of new schemes in England can tell what an advantage this is. A youth thus educated comes to the office with great advantage, and should he find that his knowledge in any given direction requires farther development, he will have no difficulty in improving it, either by attending lectures such as those given at King's College, or by other means which may be readily found if sought after. Unfortunately, however, a number of pupils in engineers' offices are not men of this stamp, and in many instances are less distinguished for their education and industry than for their liking for theatres and music-halls, where too many spend the evenings which should be devoted to reading and study. The foreign system seems to me to be rather calculated to produce a uniform level, it may be of talent or mediocrity, while under the English method a process of weeding-out goes on, the fittest alone being able to hold their own in the race of life. This part of the subject naturally leads to the consideration of what an engineer should be. As I have before observed, he should have good, sound, scientific knowldge, and should be so far a master of theory as to be able to apply it when requisite to the various works he may be called upon to design. And here let me observe that I believe true theory and practice always go hand-in-hand, the one enlightening the other, and practice exemplifying the truth of theory. The engineer should be able to design and prepare drawings, specifications, and estimates for all works which are usually considered to be within the limits of engineering, and should, moreover, be thoroughly competent to superintend the execution of works entrusted to his care. For this purpose an intimate knowledge of the numerous materials used in construction should be possessed by him; with the nature and uses of earths, the many kinds of stone, timber, iron, mortar and cements, bricks, &c., he should be thoroughly acquainted; nor must he be backward in his knowledge of the value of the several materials, both in the rough, and when worked and fixed in the structure; for if he knows not good work, and good workmanship, too, from bad, he cannot effectually superintend them. The engineer must also have sufficient knowledge of mensuration to enable him to measure up accurately the various kinds of work done by contractors. In the field, the engineer must be able to survey, level, and set out work with accuracy and despatch; while for Parliamentary work an intimate acquaintance with the "Standing Orders" is indispensable. To all this must be added strict business habits and sound common sense; for otherwise the engineer will never be a safe adviser for companies, and others his clients, in the expenditure of the great sums of money so often laid out upon his recommendation. I hardly know how to define the meaning of the term "business habits" any more than the words "common sense,—a quality which, although considered indeed common (for every one believes that he has it), is often conspicuous only by its absence. Business habits seem to me to be hardly habits at all, but rather a special quality in the mind of the individual leading him on all occasions to be prompt and ready, to be always to his time, to keep faithfully his appointments, to have all his belongings and works in perfect order, and generally, before he enters upon a subject or undertaking, to have made himself master of it. Above all, I would insist that an engineer must be a gentleman. I do not mean by this that he should be possessed merely of that surface-polish which too often passes current in the world, and which is, when taken by itself, but a miserable varnish, frequently covering the basest feelings and inclinations of mankind; but what I mean by the term is this: that he will be courteous and considerate in all intercourse, whether with his equals or with those below him; that he will be thoroughly honourable and upright in all his dealings; as much above taking a bribe as he would be above picking any one's pocket; fair and just to both employer and contractors; and

that he will do nothing in the least degree unfair or unhandsome towards his professional brethren. It is only by setting before ourselves a high standard, and endeavouring to act up to it, that we can successfully maintain the honour of the profession, and cause it to occupy even a higher place in the estimation of mankind than that which it now holds, and therefore I have dwelt with some emphasis upon this essential element in the character of an engineer.

The remainder of Mr. Butler's address was devoted to a *resumé* of the progress of engineering since the commencement of the railway era, and to a review of future prospects. It was incidentally mentioned that Mr. G. J. Morrison had lately resigned his position as one of the vice-presidents of the Society, and gone to China as the engineer of the first Chinese railway.

CASES UNDER THE BUILDING ACT.

WOODEN BUILDINGS.

AT the Clerkenwell Police Court, Mr. John Goodman, builder, of Bentley-place, Dalston, was summoned before Mr. Chance by Mr. Rowland Plumbe, the district surveyor of South Islington, to show cause why he did, in the rear of No. 75, Balfour-road, Highbury New Park, "enclose a building with wood, contrary to the first schedule, clause 1," and omit to do certain things required by the Act, to wit, "enclose the building with walls constructed of brick, stone, or other hard and incombustible substances, as required by the 1st schedule, clause 1." Mr. Richard Jones, solicitor, attended on behalf of the defendant.

It appeared that the building is erected on a platform formed of earth, and banked up with clinker work, so formed at the end of the garden standing against the side wall of No. 17, Highbury Grange. The platform is raised above the surface of the garden, level with the wall, there being a space of about 12 ft. 6 in. between it and a pair of carriage-gates formed in the front fence wall, 8 ft. wide. The building complained of is 11 ft. by 7 ft. outside, about 6 ft. 4 in. wide, and 10 ft. 10 in. long inside, and about 7 ft. high at the lower slope of the roof, rising to 9 ft. high at the ridge. The building is inclosed on all sides, having in the front a pair of folding doors, 6 ft. wide by 6 ft. 9 in. high, and there is a window at the side. The sides and back are covered with boarding outside, and lined with match boarding inside, the total thickness of the inclosures being about 2¼ in. The building is roofed with a span roof covered with zinc, on boarding carried by rafters, having a wooden gable in the side facing Balfour House. The floor is of wood, on wooden bearers wedged up on the platform. There are three discs of wood on each side of the building, to represent wheels bolted to the floor bearings. At present the wheels do not run, there being no joint between the point of the wheels and the side, and the surveyor said he did not believe they would carry the building as at present fixed. The building projects 6 ft. 9 in. beyond the general line of frontage of Grange-road, and it is placed about 2 in. from the wall of the house. The defendant in his notice called this building "a summer-house." Mr. Plumbe stated that he had evidence that it was intended for the purpose of keeping a patent steam bicycle or other similar conveyance. Even if it was a summer-house it was not exempt, and the building was irregular, and not in accordance with the first clause of the first schedule of the Building Act. It is claimed, said Mr. Plumbe, that the building is a temporary one, or one to which the rules of the Act do not apply, then by section 10, the sanction of the Metropolitan Board of Works should be asked, of which he should have received notice, but such notice had not been received by him from the Board. On these grounds he had to ask the magistrate to exercise his power, under section 46, to make an order commanding the defendant to comply with the requirements of the notice served upon him as the builder under section 45 of the Act. Evidence having been given at some length, Mr. Jones contended that this was not such a building as was contemplated by the Act, and asked the magistrate to dismiss the summons, and that with costs. The building was never intended for a dwelling-house, for in the winter it was used solely for the purpose of keeping plants in, and in the summer it was wheeled into the middle of the garden, and was then used as a summer-house and smoking saloon.

Mr. Chance said he did not think that the building in question came under the category of "other buildings" mentioned in the section, and dismissed the summons, but without costs. A hard-and-fast line could not be drawn, but he was firmly of opinion that the building did not come within the intention of the framers of the Building Act. In dismissing the summons the magistrate said he was quite willing to grant a case for the consideration of the court above if one was required.

Mr. Plumbe said he would consult the Metropolitan Board as to whether he should take a case or not.

This most extraordinary decision, in the face of scores of decisions the other way, given in this and other police-courts of London, would, if allowed to remain unchallenged, greatly interfere with district surveyors in the discharge of their duty, and if acted on would bring about a perilous state of things. Steps should be taken at once, by appeal to a superior court, to obtain the revision of Mr. Chance's judgment.

Architectural Design. — Lord Francis Hervey, M.P., has offered a prize of 5*l.* for architectural design to the members of the Birkbeck Literary and Scientific Institution, Southampton Buildings, Chancery-lane.

ARBITRATION CASES.

A LANDSCAPE GARDENER'S "EXTRAS."

MR. EDWARD WORTHINGTON, registrar of the Manchester district registry of the High Court of Justice, has recently made his award in the case of Shaw *v.* Jones, which was referred to him as arbitrator. The action was brought on July 23rd last, in the Court of Common Pleas at Lancaster, Manchester district, by Mr. John Shaw, of the Stamford Nurseries, Bowdon, landscape gardener, against Mr. Thomas Jones (Messrs. Barlow & Jones, merchants, Manchester), who resides at Erlesdene, Green-walk, Bowdon. It appears that Mr. Jones employed Mr. Shaw to lay out and plant the extensive grounds attached to his newly-erected mansion adjoining the Green-walk, and that a written contract was entered into between the parties on October 12th, 1872, by which Mr. Shaw agreed to find the whole of the labour and material required on Mr. Jones's land for laying the same out in conformity with plan and specification for the sum of 780*l.* The real dispute in the action, however, related to extras, since after the action was brought the defendant paid into court a sum exceeding the balance of the contract. The action was brought to recover the sum of 441*l.* 19s. 9d., the amount being arrived at as follows:—Amount of contract for laying out grounds, 780*l.*; extras, 284*l.* 3s. 9d.; total, 1,064*l.* 3s. 9d.; less credit given for cash, &c., 622*l.* 4s.; leaving a balance of 441*l.* 19s. 9d. The defendant pleaded that he was not indebted except as to 228*l.* 14s. 3d., which he paid into court with his pleas. Mr. Mills, of the firm of Messrs. Mills & Murgatroyd, of Manchester, was the defendant's architect, and under a clause in the contract the defendant's solicitors endeavoured to obtain an order to refer the matters in dispute to Mr. Mills. This was resisted by plaintiff's solicitors, and by order of Mr. Baron Cleasby the matters in dispute were referred to Mr. Worthington, the district registrar. The arbitrator sat at the Mitre Hotel, Manchester, on the 7th, 8th, and 9th of October last.

The arbitrator's award, which was made on the 19th Nov., after reciting the order of reference, &c., proceeds,—"I do award that the plaintiff had good cause of action against the defendant, and that the plaintiff is entitled to recover against the defendant in respect of the said action, and all matters in dispute between the said parties brought before me, in addition to the sum of 228*l.* 14s. 3d. paid into Court, the sum of 116*l.* 8s., which additional sum I award and direct shall be forthwith paid by the defendant to the plaintiff. And I do further award that the defendant shall bear and pay his own costs of the said reference, and that he shall also pay the costs of the plaintiff of the said reference. And I do further award that my costs of the said reference and of this my award shall be borne and paid by the defendant."

THE IMPROVED APPROACH TO THE THAMES EMBANKMENT FROM BLACKFRIARS.

THE widening of the roadway at New Bridge-street, Blackfriars, leading on to the Thames Embankment, being a continuation of the line of frontage of the new Royal Hotel to the corner of William-street, has just been completed, and is intended to be thrown open for traffic next week. By the improvement the extreme width of the roadway between the south-west side of the hotel frontage and the entrance to the Metropolitan District Railway Station has been increased to 90 ft., with a similar width on the side between the hotel and the approach to Blackfriars Bridge, and an addition has likewise been made to the width of the thoroughfare between the Embankment and Queen Victoria-street. The addtional space thrown into the roadway at its widest part is about 40 ft. The new footpath between the hotel and the corner of William-street, New Bridge-street, at the north-east boundary of the widened thoroughfare, is carried on seventeen strong brick arches. Mr. Webster has executed the contract. It is stated that additional crossing refuges are to be erected, in consequence of the great width and area of the enlarged thoroughfare. The triangular piece of land adjoining the hotel, and extending to William-street, has been for some time announced as for sale on building leases, but within the last few days this announcement has been removed, and it is said that the site has been secured for the erection of insurance-office buildings.

A Picture for Bradford Town-hall.—Mr. Angus Holden has presented to the Corporation of Bradford Mr. E. T. Parris's painting of the Coronation of Queen Victoria.

ST. JOHN'S, NEWFOUNDLAND, AND THE CATHEDRAL.

WE had been steaming all day along a rugged barren shore in the teeth of a piercing wind, but night fell before the light from the hill-top showed us we were nearing St. John's.

A massive front of black shadow towering to the sky stretched before us, the waves dashing angrily up the furrowed cavities of the cliffs, and we wondered where the gate could be through this gloomy barrier. A narrow defile, however, soon appeared to view, through which we carefully threaded our way; for even this was studded with sunken rocks, and the lights of a city resting on a hill-side burst upon us.

The hills surrounding St. John's are so high, and the harbour is so small, that although it was almost blowing a gale outside, the water inside was as calm as a mill-pond, and the beams reflected from a thousand lights serpentined sluggishly in the watery mirror.

By day the appearance of St. John's is not so theatrical. Its natural beauties, indeed, are equalled by few cities, but, like many colonial towns, man has not done much to assist nature. Art is almost unknown, and, like many another place in British North America, it is considered only as a depôt for making money, not for spending it; for, as soon as a man becomes wealthy, and has travelled sufficiently to give him good taste, he leaves for a more civilised home.

As may be expected, then, the ordinary buildings of St. John are commonplace structures in the extreme, of stone, brick, or wood, and with a lamentable absence in the latter of that most essential element with them,—paint; while their public buildings, with few exceptions, are distinguished by glaring evidences of bad taste, and an apparent waste of money without any return for it.

The most notable exception is the cathedral, by Sir G. G. Scott, which, with its old weather-beaten and stained appearance, its unfinished condition, its damaged transept footings, its decayed stones and defaced mouldings, rendered almost undecipherable by frost and snow and salt-sea fog, seemed almost like an old friend of the fourteenth century, built by master-hands of a country that knew not America, and left here friendless and forgotten, with no tie of relationship or of kin to the dwellings and churches around it.

We have no hesitation in saying that from an inspection of most of the religious structures in North America, both in the United States and in Canada, there is not one which so nearly approaches the time-honoured Mediæval cathedrals in its noble proportions, its massive simplicity, its gloomy grandeur, its correctness of detail, and its splendid workmanship as this fragment of a cathedral in St. John's, Newfoundland.

The cathedral, as it stands, is scarcely more than half built, for the transepts, central tower, and chancel, exist only on paper. There is a talk now among the moneyed men of finishing the transepts and tower, and leave the chancel. We hope, however, that enough funds will be raised to finish the whole, so that the design of its eminent author may be seen in its entirety,—a design so noble in its grand proportions, its massive majesty, its simple yet effective ornamentation, its varied yet harmonious detail, and so free from the garishness and meretricious ornamentation of so many of our modern ecclesiastical edifices, that we are of opinion, from an examination of Sir G. G. Scott's late designs, that even he would do well to study it anew, and commence therefrom afresh.

Halifax, Nova Scotia. AND. DEWAR.

PURE WATER.

YOU have in your pages often recurred to the subject of the polluted water-supply of towns,—but I think hardly sufficient attention has been drawn to the universality of the evil; for instance, I believe hardly a town or a village could be shown in which, on examination, cases of water-pollution to a dangerous extent would not be found to exist.

I will give two examples:—

1. The large school (now I believe discontinued) at which I was educated was situated just below a large grave-yard, the pump being about thirty yards from its lower boundary.

2. At a frequented bathing-place is a row of four small lodging-houses, the four court-yards of which altogether occupy less than 400 square yards, into which space are crowded all the

cesspools into which the whole of the drainage of the four houses is discharged, and the pump is placed in the midst. The soil is remarkably porous.

P. P. C.

THE WORD "RINK."

SIR,—In reply to your correspondent "B. W.,' the word "rink" is of Scottish derivation, and instead of signifying "ring," is a near approach to "ground." In fact, it is a special term to denote a place where people may skate on some other substance than ice. Hence, it is *not* wrong, nor is the use of it a vulgar habit.

If "B. W." had exercised his individual "common sense" he would have recognised that the primary use of this word would be to signify sound as the "ring" or "rink" of the skates; its secondary use referring to place.

PROPRIETOR.

SIR,—Isn't a *ring* supposed to be *round*,
Or in other sense isn't it a quality of *sound*?
Neither being a *sine qua non* for skating,—I think
We shall not be wrong if we stick to *rink*.

J. M. K.

SIR,—The term "rink" is peculiarly Scottish, and properly denotes the portion of ice occupied by a party engaged in the roaring northern play of "curling." In modern times the term has come to be employed to denote any frozen surface on which a game is played and exercise indulged in.

C. B.

SIR,—Pray allow me to record my agreement with your correspondent "B. W." in his condemnation of the word "rink." If it has any meaning in any country it has none in England.

There is another word which has been frequently misapplied. Why should a cattle-market be called a Smithfield? If once upon a time a cattle market was held upon Smithfield, in London, should a new cattle-market in the country be called a "Smithfield"?

C. S.

TADCASTER CHURCH.

SIR,—I would not willingly increase the indignation and horror of your correspondent, "J. G.," but the melancholy fact is the church has been taken down, and is partly built up again; and we hope that, under the skilful and energetic management of our contractors, Messrs. Pearson, of Leeds, we shall have a renewed and comfortable church to worship in, by Christmas next year. "J. G.'s" agonised appeal, therefore, is now useless; and, what is more, it would have been equally unavailing if, like similar appeals, it had reached us months ago.

Sir Gilbert Scott was no doubt perfectly right in pronouncing the church capable of restoration. Others had the same opinion, but the parishioners generally, who had experienced the discomfort attaching to the lowness of its situation, in the bottom of an almost basin-shaped churchyard, close to the river Wharfe, were surely better able to judge of what was most desirable, than any professional gentleman, after a mere few hours' acquaintance with the spot. Nearly all who had examined the church proved to be wrong as to the state of the roof. I do not know who the local builder may be to whom "J. G." refers, neither does it matter. The fact was that the timbers were terribly decayed, and no sooner did the workmen begin to touch the chancel-roof than it fell down bodily with a crash, though happily without accident to any person.

The north walls, though out of line both horizontally and perpendicularly, were found to be extremely strong, but the eastern and southern walls required to be taken down, under any circumstances; and, in short, nearly as much new work must have been introduced had the church been merely repaired, as will now be the case in the actual mode of dealing with it. Even now it will be as much as possible the old church, but raised 5 ft. higher out of the hollow, admitting of ventilation beneath the floor and a system of hot-air warming besides,—two things from the absence of which the congregation have suffered sadly.

This thorough restoration and improvement would have been carried out sixteen years ago, costing a third less than it will now do, had it not been for two opposers, whose consent was indispensable, and we might have had, all this time, the enjoyment of a commodious and comfortable church. Since then the subject has been broached again and again. Why did not the archæologists, whose minds were so tortured by the probable fate of our ancient and beautiful church, rush in at once, and at their own expense take the matter out of our barbarous hands? Why wait till the sacrilegious deed was begun, and then content themselves with "braw words" of remonstrance, protest, and appeal? But I believe that, when they see the new-old church lifted out of the mire, and proudly defying the waters at its feet, they will forgive us the crime we have committed as freely as we forgive them their well-meant efforts to prevent it.

A PARISHIONER.

STAMPS ON CONTRACT PLANS AND SPECIFICATIONS.

SIR,—I for one beg to thank you for your inquiry and information upon the above subject, having heard many different *legal* arguments upon it.

There is yet another point that so frequently springs up in connexion with small contracts that I shall be glad of an opinion upon, namely:—When a contractor sends in a tender for works according to plans and specifications, and receives a reply stating that his tender is accepted, whose duty is it to see that a proper agreement is drawn up, and that, together with other papers, stamped? Is it on the part of the proprietor or contractor, or both? And if the proprietor or his architect omit to have it done, is the contractor precluded from suing for any balance due according to the amount for which he tendered because no stamped agreement has been drawn up, neither have any other papers including the tender been stamped? Such is the opinion of a solicitor in this locality (unless the *contractor* is prepared to pay the penalties). Would not the proprietor be the responsible party for the penalties, being the custodian of the papers, should he wish to produce them as evidence in court? I am aware the papers could not be put in as evidence unless stamped. That being the case, would not an offer made by a contractor to do certain works at a price stated, but which proprietor did not care to have made an agreement, be looked upon as an arrangement upon good faith, and in the event of any dispute arising the only and proper course then left would be to have the works measured and valued? I may mention that the particular case referred to was, in consequence of the danger of penalties, referred to an architect. I would also ask should not all papers be stamped that are submitted for reference, the same as required by County Courts?

AN ARCHITECT AND SURVEYOR.

THE EAST WINDOW OF CARLISLE CATHEDRAL.

AT the winter meeting of the Cumberland and Westmoreland Archæological Society, held at Carlisle on the 9th ult., Mr. R. S. Ferguson read a paper on the old glass in the east window of the cathedral. After pointing out how inadequately the east window has been treated by the numerous writers of tractates dealing with the cathedral, who have, with one exception, so far overlooked the ancient glass in the upper part of the window as to conclude that Scriptural subjects were represented, he stated that, in fact, the whole of the old glass represents one connected subject. It is what is technically called "A Doom," depicting our Lord sitting in judgment, the procession of the blessed to the palace of Heaven, and the place of punishment of the wicked. The tracery of the window is generally considered one of the most perfect designs of window tracery in existence, and is composed of portions of no fewer than 263 circles, and contains thirteen quatrefoils,—namely, four just above the alternate mullions, and nine others. The great east window of York Minster contains only four quatrefoils, the rest of the tracery being composed entirely of trefoils. The cathedral window has eight mullions, after describing the peculiarities of which, Mr. Ferguson noted the curious fact that the stonework of the window remained unfinished for nearly 400 years from the time of its erection. After the burning of the cathedral in 1292 funds to rebuild it were difficult of acquirement; thus the work progressed slowly, and stopped when the money failed.

CHURCH-BUILDING NEWS.

Nottingham.—St. Mark's Church, Nottingham, was reopened on the 8th ult., after restoration and enlargement. A new chancel has been added, with organ-chamber and vestry, the organ being removed from its former position in the west gallery. The new chancel is floored with Minton's tiles, and some simple stained glass has been promised for the east window. The church is heated by hot water, the seats throughout have been made more convenient, the gallery front lowered, and the method of lighting entirely altered. The cost will be about 1,600*l*. The work has been carried out by Messrs. Marriott, Wartnaby, & Scott, builders, under the direction of Mr. W. Arthur Heazell, architect.

Slough.—It is proposed to add to Slough parish church a chancel, aisles, and large transepts, with vestry-room. The present buildings will be reseated and serve as a nave, until such time as it may be possible to build a new nave to harmonise with the portion that is now to be added. By these means seats will be provided for 1,000 people. The plans have been prepared by Mr. John Oldrid Scott, who estimates the cost of the whole at about 8,000*l*.

Netteswell.—Netteswell Church, which had fallen into a very dilapidated condition, has been substantially restored, and a new vestry added. The plastering has been removed from the outside walls, and the flint work repointed. The old stonework to the windows and doorways has been carefully preserved, and only restored where absolutely necessary. The roofs have been all stripped and repaired, but that over the chancel is entirely new. The bell-turret is new, and is covered with oak shingles. The south porch has been rebuilt, some of the old timbers being replaced in their original positions. A new floor has been laid in the chancel with Godwin's encaustic tiles; and Peake's Staffordshire quarries are used for the pavements in the nave, vestry, and porch. The windows have been reglazed with cathedral glass, and fragments of the old stained glass have been releaded and refixed. New oak benches are provided for the nave; the chancel fittings are also new, and of the same material. The pulpit is of stone. Porritt's air-warming stove is adopted for heating. Throughout the work care has been taken to preserve the existing features of the building. The architect was Mr. F. Chancellor, and the works have been carried out by Mr. Gibbons, of Buntingford, at a cost of about 900*l*.

Newcastle-on-Tyne.—For the first time since the work of restoring the church of St. Nicholas was commenced, divine service was held in the nave and transepts on the 28th Nov. The chancel and aisles remain yet to be finished, but these will not occupy more than another year. The work of renovation commenced under Sir Gilbert Scott, R.A., in June, 1873, and two-thirds of the labour have now been got through. When fully completed, the architect himself avers that it will rank among the largest and noblest of our parish churches, amply repaying all the expenditure lavished upon it. The church when wholly restored will not be divided into two parts; it is intended that it shall be thrown open from end to end. In addition to sitting accommodation in the nave and transepts, there will be sittings in the chancel as heretofore. The floor is covered with Stettin oak benches (supplied by Messrs. Farmer & Brindley), carved at the ends, and adequate to seat 600 persons; and in the transepts temporary sittings have been fixed for another 600, so that, upon the completion of the chancel, 2,000 persons will be able to be accommodated with seats. With regard to the cost it may be stated that 11,000*l*. have been already laid out, and at least another 6,000*l*. are wanted to complete the work. Indeed, it is not unlikely that the gross expenditure will reach 20,000*l*., as a new organ and other additions will probably be necessary. Mr. Walter Scott, of Newcastle, has had charge of the workmanship, while the clerk of the works has been Mr. James Yeoman.

Poplar.—The new chancel of St. Matthias's Church, Poplar, was consecrated on the 21st ult. In 1866 a new district, with a population of 4,500, was formed in Poplar, and the old East India Chapel (built in 1654) was repaired, altered, and enlarged, so as to serve as the district church. On account of the continued growth of the congregation it was last year found necessary to enlarge the church by the addition of a chancel, by which means 150 extra seats are obtained, making the total number of sittings 970. The new chancel has been erected by Mr. J. Kemp Coleman, builder, of High-street, Poplar, from plans by Mr. E. Evans Cronk, architect, Cockspur-street.

Corringham.—Corringham Church, near Romford, has been re-opened, after repairs. The roof of the north aisle has been entirely renewed, and the ceiling of the nave is of match-boarding. The work has been carried out by Mr. Thomas Gregory, builder, of Clapham Junction, in accordance with designs by Mr. W. White, F.S.A.

Twickenham.—The new church of St. Stephen, Twickenham, was consecrated on December 1st. The first stone was laid on September 28th, 1874, by the Princess Mary Adelaide (Duchess of Teck). The work was delayed until the spring, when Mr. Shepherd, the contractor, under the superintendence of Messrs. Lockwood & Mawson, of Lincoln's-inn-fields, the architects, commenced operations. That part of the church which is erected consists of a nave and two aisles, with a temporary east-end wall. The building is of white brick, with an external face of Kentish rag stone, lined with Suffolk bricks, and with Bath stone dressings. Sittings are provided for 500 people.

A Fine Pollard Oak.—One of the finest specimens of pollard oak ever grown in England was sold the other day in Liverpool. Its trunk was 14 ft. in length and 21 ft. in circumference; its actual weight, inclusive of the root, being thirteen tons. This tree, which was grown near Chipping Norton, in Oxfordshire, is to be used for furniture. It was opened at the Brunswick Saw Mills, Liverpool, and presented a rich brown appearance, resembling in every respect tortoise-shell, and being perfectly free from shake. The tree is calculated to produce 70,000 ft. of veneers, their value being estimated at 500 guineas.

INUNDATIONS, AND THE MEANS OF PREVENTION.*

CAUSES.

AT the least ten different causes, direct or indirect, and acting individually or collectively according to the locality, have to be provided against as regards their results.

1. *Heavy and continued Rains in the River Basin, generally the upper Portions.*—This is a common and obvious cause of inundation. All the great inundations on record have been preceded by three or four days' continuous rain. This fact shows how large is the area over which atmospheric condensation takes place, supplying clouds, following each other in rapid succession, and sufficient in extent to cover the menaced basin uninterruptedly for several days.

2. *Falls of Snow.*—A common and immediate cause of freshets in the neighbourhood of mountain ranges or snow-clad peaks.

3. *Simultaneous Concurrence of Freshets from several Affluents.*—This is a source of great danger, more so than the other two causes just specified, as these are of more common occurrence, and consequently the bed of the stream is better prepared for them.

4. *Impermeability of the Stream's Bed.*—A not unimportant cause.

5. *Declivity of Surface about the upper Portion of the Stream.*—Rain, however continuous, falling on a plain, works its way slowly to the lines of water-course, distributing its power, so to speak, over the whole surface. Falling upon steep slopes, like the watersheds of the Pyrenees, the Haute-Loire, &c., it produces an immediate torrent-like rush of the water to the lower levels, resulting in a more or less instantaneous inundation of the plain.

6. *Encroachment of Riverine Constructions and of the Banks upon the Streams.*—This is one of the principal causes, and requires most consideration. In nearly all towns and cities the confinement of the stream resulting from the erection of wharfs and quays is a source of danger, which can only be averted by the construction outside the town of channels for diverting some of the water.

7. *Insufficient Water-way, and inadequate Height of Bridges.*—Some bridges, old-fashioned stone bridges more especially, are veritable dams. Their powers of resistance are oftentimes very remarkable, as in the case of the old bridge at Toulouse. But the sudden arrest of the current so produced is a palpable source of danger. Stone bridges *with small arches* should be proscribed in such situations. The most suitable erections are wrought or cast-iron bridges of the largest span practicable.

8. *Sharp Bends in the Stream.*—These often produce dangerous rises of the water. The comparatively still water above the elbow acts as a sort of dam to a rush of descending water, causing it frequently to rise many feet above the surface level of the stream.

9. *Friction of the Water against the Bed and Sides.*—Some streams have smooth beds offering no impediments to the transit of the water; others are encumbered with rocks, stones, water-plants, &c., which reduce the sectional area of the stream, leaving only a narrow tortuous channel for the water. This retardation of the water may cause certain portions of the stream to overflow the banks; on the other hand, it may prevent the water accumulating with dangerous rapidity further down stream.

10. *Destruction of Timber.*—This has often been regarded as the prominent cause of modern inundations. No doubt, trees and herbage prevent the rain-water finding its way to the water-courses as rapidly and directly as it would over bare ground. But history shows us, too, that in the days of the Romans, many parts of the country then clothed with forests, notably Gaul and the Maritime Alps, were visited with inundations as formidable as those of recent date. It is not meant here to deny the utility of re-wooding, but simply to point out that it is not the unique and unfailing specific that it sometimes has been represented.

MEANS OF PREVENTION.

Having enumerated the principal causes, it now remains to pass in review the several means of preventing inundations hitherto adopted or proposed.

1. *Longitudinal Embankments.*—This method, the simplest of all, has been in use from time immemorial as a preventive of inundations. Unfortunately, as a rule each proprietor has thought but of his own safety, irrespective of that of his neighbours; riverine proprietors, too, are loth to spare the smallest scrap of their ground for the general weal, or to renounce any of their rights over such portions of the foreshore as may be cultivated or built upon in the interval between the recurrence of two *great* inundations. The result is that almost everywhere the embankments and wharfages are too close together, and trench far too much upon the *lesser bed* of the stream. Hence it follows that embankments, in place of being a remedy against, are actually a source of danger, which explains the virulence of the opponents of the system of embanking, who have not troubled themselves to inquire whether the principle has been rightly or wrongly applied in each case. It is therefore necessary to raise the height of the embankments from year to year, so that in old towns, the present level of the quays and roadways is 15 ft. to 20 ft. above that of the Roman remains or even of the twelfth and thirteenth century constructions, owing to the successive increments of height rendered necessary by the continual rise in the bed and level of the stream. And not only does this narrowing of the stream by embanking raise the level of the water, but by checking the current in parts it encourages the deposit of silt and gravel, which, in their turn, get carried down to the narrowest parts. The further we get down stream the more surely these deposits are found. These natural consequences of misplaced and encroaching embankments have led to the superficial conclusion that in the long run the water always surmounts the embankment, and that the latter is, at the best, but a costly palliative. This is going too far. Embankments should be used; but they should be sufficiently far apart to leave a *major bed* for the river between them, of dimensions sufficient to admit of the flow of a determinate volume of water moving with greater or less velocity. For ages Lombardy has been saved from inundations by longitudinal embankments. In every case, a sufficient width has been left between the opposing embankments, and they have never failed of their object.

The Po, a much less dangerous stream than the Loire, has a *major bed* of 1½ to 3 English miles wide, and some of its Alpine affluents have widths of 600 yards to 900 yards between their embankments; the Sesia, 540 yards; the Trebbia, 550 yards; and the Taro and Enza, 900 yards.

2. *Transverse Embankments.*— These should be combined with the foregoing, so as to form reservoirs of suitable capacity along the course of the stream in which the flood waters may be received and slowly discharged. The positions of these basins must, of course, depend upon the configuration of the ground. The land so enclosed need not lie idle. The silt left by the water is a good fertiliser, and the ground will only be submerged at intervals more or less distant.

3. *Self-acting Dams.*— But besides longitudinal and transverse embankments to keep the waters within certain bounds and to moderate the rate of flow, it is also necessary in dealing with large volumes of water to have means of controlling the level at will. For this purpose it will be necessary to establish an economical system of self-acting dams by which the level of the water may be raised or lowered as required.

4. *Organisation of a System of Telegraphic Warnings along the Valleys of the principal Streams in Times of Flood.*

5. *Widening of Bridges; Setting back of Wharfages.*

6. *Formation of Supplementary Channels.*

7. *Preservation of Bends and Hollows.*—One of the commonest faults in what is called the "improvement" of streams is the wish to shorten the distance from point to point by substituting straight cuts for the sinuosities produced in the course of ages by the geological and topographical features of the ground. A fundamental rule of hydrology is that in works of this kind the proper equilibrium must always be maintained between the weight of water, its velocity, and the friction it exerts against the wet surface of its bed.

8. *Building in Piles or Arches.*—This natural method of protection may be employed for erections of all kinds on land subject to occasional or periodical inundations.

9. *Dredging* is generally carried out upon too limited a scale to be of much utility. It may prove useful in removing local obstacles, and so preventing partial inundations.

10. *Planting.*—Although, as before remarked, it is not a radical and direct remedy for inundations and the evils thence resulting, it is nevertheless of great utility both in a hydrological and an agricultural point of view. Turfing the sides of the mountains with terraced slopes, on the plan described by Polonceau, is always to be recommended.

* By M. Oppermann: translated from the *Technologiste*, October, 1875.

PROTECTION FROM FIRE.

THE Metropolitan Water Act of 1871 authorised the Metropolitan Board of Works to provide hydrants in connexion with the Water Companies' pipes for the supply of water in case of fire.

The Honourable Society of the Inner Temple have taken the first step in this direction, and, acting on the advice of their surveyor, Mr. Arthur Cates, they have laid down throughout their extensive property a new series of water mains, with a complete system of hydrants, from which every portion of their buildings can be effectually commanded,— the object to be attained being to secure the power of effectually attacking any fire immediately on its outbreak, without waiting for the attendance of the fire brigade. Of course, a constant supply of water with a sufficient pressure is essential, and in this instance the mains are connected with those of the New River Company in Fleet-street and Whitefriars, and the arrangements have been made in concert with that company, who now give a constant supply under pressure.

On the 21st ult. the works were tested with highly satisfactory results, the hose being fixed to the hydrants or stand-posts by the Society's own servants, powerful jets of water, which were thrown over the highest buildings, being at once obtained, the result showing that in case of outbreak of fire it could be at once attacked by the officials resident upon the spot, and with such force of water as probably to ensure success.

The mains and hydrants were fixed by Messrs. Beard, Dent, & Hellyer, of Newcastle-street, Strand, and the Benchers of the Inn may be congratulated on having been the first to apply the wise provision of the Legislature, and thus furnishing means of protection from fire which should exist in every street of the metropolis.

WHO'S IN FAULT, BUILDER OR PARISH SURVEYOR?

SIR,—Knowing your willingness to expose or remove all inconvenience to the travelling public, I beg to call your attention to certain buildings in Chapel-street, Edgware-road, where the builder has occupied three-parts of the pathway with his hoarding, and only left 3 ft. for the thousands of passengers passing to and from the railway, as well as the general public." Here, without any rail or footboard, hundreds of passengers are compelled to walk in the muddy road, exposing themselves to the danger of being run over by the numerous cabs and carts passing all day long. This has been the case for many weeks, and are we to suffer from this gross neglect until some of us are run over and killed? As I believe it is against the law, I trust you will be pleased to expose this.

A WORKING MAN.

APPOINTMENT OF ARCHITECTS TO SCHOOL BOARDS.

MR. J. B. PEARCE, of Norwich, has been appointed architect to the Birmingham United District School Board, and also to Bramerton and Kirby Bedon School Board.

Mr. W. H. Powell, of Mecklenburgh-square, has been appointed architect to the Dartford School Board.

At a meeting of the Newchurch School Board, held on the 16th ult., at Bacup, the secretary read applications from the following for the appointment of architect to the School Board:—Mr. J. H. Hargreaves, of Rawtenstall; Messrs. Maxwell & Tuke, Bury; Mr. Clifton H. Whittenburg, King-street, Manchester; Mr. Harry Percival, Newchurch; Messrs. Hitchon & Bell, Burnley; Messrs. Andrew Wilson, Son, & Aldwinckle, London; and Mr. John Sutcliffe, Bacup. Mr. Nichols remarked that the applicants had said nothing about the terms.—The chairman said that the usual charge was 5 per cent.—Mr. Nicholls did not think it was so. He believed that some *architects made it a rule to charge less for schools than for other buildings.*—Mr. Howarth asked if it were advisable to limit the appointment to local applicants, as had been suggested?—The Chairman thought that London was out of the question on account of the distance.—Mr. Howarth thought that Manchester was too far.—

Mr. Perkins thought their local men were likely to give most attention to the work, as they would be on the spot constantly.—On the motion of Mr. Howarth, seconded by Mr. Aitken, it was resolved that the candidates be reduced to the four local gentlemen.—The candidates were then balloted for, and Messrs. Hitchon & Bell were declared to have been duly elected, the voting being as follows:—Messrs. Hitchon & Bell, 5; Mr. Percival, 4.

GREENSTED CHURCH.

SIR,—This ancient wooden edifice, as seen from the south, and, as restored, is engraved in the *Builder*, No. 318, where it is stated, upon the authority of Bede, that, formerly, all churches in England were wooden, and that at York and Salisbury the earliest churches were wooden. Now, I believe that the only British specimen is at Greensted, near Ongar, in Essex, interesting by reason "of the material of which it is constructed, from its undoubted antiquity, and from the strong evidence that exists of its having been originally built as a place for the reception of the corpse of St. Edmund, which, on its return from London to Bury St. Edmunds, A.D. 1013, was, as Lydgate, a monk of that monastery (St. Edmund's), informs us, conveyed in a chest or feretory." This king began to reign in East Anglia, A.D. 855. He was crowned the following year at Bury, and is believed to have been killed in battle, A.D. 870. Camden states (1602), Greensted Church is "a very uncommon ancient buiding,"—and,—"the tradition of the place is that a dead king rested in it." The ancient road from Bury to London passed through Greensted, so this fabric might have been erected as a temporary shrine for the reception of the royal corpse, and then used as a parish church, which "derived light from three dormer windows of most domestic appearance; and an open wooden porch, without style or beauty, gave access to the church on the south side by means of a very low door." Camden stated the size of the wooden church was 29 ft. 9 in. by 14 ft.; the height, 5 ft. The walls were constructed of oak split in two, let into a sill and plate; smooth, and the interior, flat. The upright planks,—twenty-five on the north and twenty-one on the south side,—"were tongued together at the junction with oak strips," so as to keep out rain effectually. This author, Camden, also described "a wooden porch, the roof of a later date, and tiled," on the south side. This old edifice is engraved in the Journal of the British Archæological Association, vol. v., p. 1, as the Shrine of St. Edmund, from a drawing by Mr. A. H. Burkitt, as it appeared in June, A.D. 1848, and whose remarks, pp. 1–6, merit perusal. He states that the woodwork was damaged by the insect, *ptinus pectinicornis*, which works during a brief period of the year laboriously. The north side, shown in this view, is stated to be "the only fair specimen of the old building." The entire length of the shrine was 29 ft. 9 in. broad; 14 ft. and 5 ft. 6 in. high at the sides. A.D. 1748, Mr. S. Letheuillier, F.S.A., published an engraving of this church, and a description of it is in "Vetusta Monumenta," when it was nearly complete. In Grose's "Antiquities of England" this church is mentioned as an interesting object. The *Saturday Magazine*, vol. i., p. 37, contains a view of this church as it appeared from the south, A.D. 1829, and which was taken from "Vetusta Monumenta" above mentioned, being the veritable "wooden chapel near Aungre." A ground-plan is appended to this view, which differs from that in the *Builder*, No. 318, as is apparent if the two views are compared with one another. The tourist desirous to see this relic should know that it is near Ongar, in Essex, accessible by railway, the church of which town is stated to be composed of Roman bricks. Four miles northward are the two churches of Willinghoe Doo and Spain,—in one churchyard, — engraved in the *Gentleman's Magazine* for June, 1822. See *Notes and Queries*, S. V., vol. ii. A pedestrian adopting my plan of viewing these buildings may return from Loughton to London by Chigwell and Woodford, viewing the churches of these places, and the site, &c., of Loughton Hall, burnt, &c., in 1836, through the ignition of a beam in a chimney, overlooked in restoring the mansion. The King's Head, Chigwell, is an ancient building, described in Mr. Forster's "Memoir of Mr. C. Dickens." The May-pole Inn is at Chigwell-row, one mile distant, and from this spot Knockholt Beeches, in Kent, may be discerned on a fine day. It is mentioned in the tale of "Barnaby Rudge." CHR. COOKE.

SCHOOL BOARD SCHOOLS.

Newcastle (Staffordshire).—The new Board schools which have been erected in the Ryecroft-road were formally handed over to the Board on the 22nd ult. The building (according to the *Staffordshire Advertiser*) has been erected at a less sum than any other Board school in England in proportion to the amount of accommodation afforded, its cost having been about 3,500*l*. The accommodation provided is for 840 children, in three departments—320 boys, 320 girls, and 200 infants. The boys' and girls' departments each consist of one large room, 57 ft. 6 in. by 22 ft., each having two double class-rooms, 14 ft. 6 in. by 22 ft. 6 in. The infants' school is 45 ft. by 22 ft., with a babies' room, 18 ft. by 18 ft., lighted by a south light, and a senior infants' class-room of the same size, lighted from the north. The roofs are open-timbered and varnished. The lighting is by square-headed windows, supplemented by lantern lights in the roof. The centre part of the roof forms a foul-air chamber, with trap-doors opening therein, to regulate the emission of foul air. The schools have cloak-rooms and lavatories, and large play-sheds, forming covered ways to the closets. The building is of white brick, with bands of various colours introduced. In the centre there is a bell and clock turret, about 60 ft. high. The design for the schools was by Messrs. Hay & Oliver, of London and Bath, architects, and was selected in open competition a year and a half ago.

Daresbury.—The School Board for the United District of Daresbury has accepted the tender of Mr. John Holland, of Northwich, for a new school to be erected at Preston-on-the-Hill, from the design of Mr. William Owen, of Warrington, architect. The works will be commenced in March next.

DISSENTING CHURCH-BUILDING NEWS.

Nantwich.—The Wesleyan chapel at Nantwich is about to be considerably enlarged, by bringing the façade some 11 ft. in advance of the old front. The architect, Mr. G. B. Ford, of Burslem, has adopted the Italian style for the new elevation, the windows having semicircular heads. The centre of the new front projects beyond the side portions. The entrance is by two bold twin doorways, with rounded lights over them, while above them, and lighting the new gallery, will be a three-light window of large dimensions. The whole front is to be built of pressed red brick, with a heavy plinth and facings of cream-coloured Hollington stone. The builder is Mr. Matthews, whose contract will amount to about 1,000*l*.

Painswick.—A Congregational church is about to be erected at the Uplands, Painswick. Mr. Tait, of Leicester, has received instructions to prepare the plans. The edifice will be in the Early English style, and is to cost about 2,000*l*.

West Thurrock.—The foundation-stone of a new Primitive Methodist chapel has been laid at West Thurrock, Essex. Mr. Gostling, of Gravesend, is the architect, and Mr. Pavitt, of Aveley, the builder. The amount of the contract is 300*l*.

Wellingborough.—A new Congregational Church was opened at Wellingborough on the 9th ult. The site of the new building, containing 2,437 square yards, is on the east side of High-street, bounded on the north by Salem-lane and on the south by a new street 30 ft. wide, the whole site having been obtained at a cost of about 1,200*l*. The plan of the building is egg-shaped, struck from four centres, the extreme length internally being 87 ft., and the width 70 ft., providing accommodation for about 800 persons on the ground floor and 400 in a gallery at the longer end. The ground-floor slopes 18 in. towards a semi-circular platform, which is 20 ft. in diameter and 21 in. high, and is placed at the smaller end of the chapel. On this platform is erected an oak pulpit 8 ft. in diameter. The walls of the building are 35 ft. high, with a flat panelled ceiling coved at the walls, terminating in an enriched moulding. The front porch is carried up with a steep gable, in which is placed a three-light traceried window. The porches, lobbies, corridors, and aisles are paved with Maw's encaustic tiles. The style of the building is Gothic, the walls being faced externally with rock-faced brown Duston stone, with hewn Duston stone buttresses, quoins, and machicolations; also Bath stone dressings and red Mansfield shafts to the columns. The stone carving is by Mr. Harry Hems, of Exeter. The entance-gates, five in number, are of wrought iron, by Mr. Reynolds, of Little Harrowden. The work has been carried out by Mr. John Boddington, from the designs and under the superintendence of Mr. Edward Sharman, architect, Wellingborough, at a cost of about 8,500*l*. Mr. Payne has acted as clerk of the works. The organ has cost 705*l*.

Lisburn.—A new Wesleyan Chapel for Lisburn has just been erected on a site (given by Sir Richard Wallace) at the end of Seymour-street, at the junction of the Belfast and Hilden roads, Lisburn. The main front is approached by a gradual incline, and a flight of steps leading to a large open vestibule, having bold, massive columns of County Down granite, the carved caps and other enrichments being of Dungannon stone. The vestibule is surmounted by an enriched cornice, over which there is a large circular stone window in the principal gable. The front is flanked by wings, which form gables at the sides. The church is 51 ft. long, 36 ft. wide, and 30 ft. high; and, with the end gallery, will accommodate over 400 persons. Advantage was taken of the slope of the ground to provide a large schoolroom below the church. The edifice was designed and built under the direction of Mr. William Gray, architect, Belfast. Messrs. Thompson, of Ballymacarrett, were the contractors. Messrs. Musgrave & Co. carried out the heating, and Mr. Carlile the gasfitting, the total cost being under 2,700*l*.

Thurso.—A new Congregational Chapel was opened at Thurso on the 9th ult. Mr. Matthews, of Aberdeen, was the architect, and the masonwork was executed by Mr. George Manson, builder, and the joiner-work by Mr. George Durran, house-carpenter. The total cost will be about 1,100*l*.

STAINED GLASS.

Edlesborough.—During the recent restoration of the chancel of St. Mary's Church, Edlesborough, on clearing down the north wall discovery was made of a two-light window, filled in with some beautiful thirteenth-century tracery; this window was entirely bedded in the wall, and it has now been opened out and thoroughly restored by the especial wish of Lord Brownlow, and filled in with stained glass by Mr. Bell, of London, the figure of St. John being represented in one light and that of St. Peter in the other. The three south windows have also been filled in with glass of a subdued tint, executed by Mr. Pepper.

Aldford.—At the Chester Consistory Court, on the 1st ult., the Chancellor of the Diocese decreed a faculty for the purpose of placing five stained-glass windows in the church of St. John the Baptist, and decorating the chancel ceiling. The cost of the work, upwards of 600*l*., will be borne by the Duke of Westminster, K.G. The architect is Mr. Douglas, of Chester, and the window artists Messrs. Heaton, Butler, & Bayne.

Oswestry.—Mr. J. R. Ormsby-Gore, M.P., has just placed in one of the windows at the east end of St. Oswald's Church a stained glass memorial window to his father and mother, the late Major William Ormsby-Gore, M.P., and Mrs. Ormsby-Gore. The subject is that of "The Four Evangelists," and the window is by Messrs. Ballantyne & Son, Edinburgh.

Weaverham (Cheshire).—In memory of the late Vicar of Weaverham, the Rev. C. Spencer Stanhope, a stained-glass window has been placed in the parish church, at the cost of the parishioners and friends, by Messrs. Edmundson & Son, of Manchester.

St. Leonard's Priory, Stamford.—The *Northampton Mercury* states that "the remains of the priory church of St. Leonard, on the Uffington-road, are becoming more and more dilapidated. During the last few weeks the outer facing of the wall immediately over the westernmost arch of the massive north arcade,—a work which has stood for more than 700 years,—has dropped away, leaving an ugly hollow several square yards in extent. What is left of the pile, where once the censer swung, and where dirges were chanted for the dead who lie buried about, forms so capacious a store-room for grain, that one would think it would be worth while to bestow upon the fabric a little timely attention, even should its claims as the oldest specimen of church architecture in Stamford be regarded as unworthy of respect."

Books Received.

Carpentry and Joinery for Amateurs: containing a full Description of the various Tools required; with practical Instruction for their Use. By the Author of "Turning for Amateurs," &c. London: The "Bazaar" Office.

THIS book contains more, in one sense, than its unpretending title-page claims for it; as it gives very extended and full information not only as to the use of tools, but as to the principles and methods to be followed in the principal classes of operations included in joiners' work; perhaps in some instances going beyond what amateur workers are likely to undertake, though this does not make the book the less useful. The illustrations of tools and of the various ways of putting wood together are very well and clearly executed; and the writing generally is marked by clearness and terseness, without omitting anything essential. The writer looks at his subject from more than a merely practical point of view, as his remarks in regard to veneering show. In giving directions for this process, he comments on the difficulties in regard to fitting veneer to curved surfaces, for which special holdfasts or "cauls" have to be made, for keeping the veneer in its place until it binds properly; "and hence it is, among other causes, that we see so many repetitions of the same pattern issued from any particular shop, and such unwillingness to depart from them. There is far more freedom in this respect when veneer is not intended to be used." Outsiders, as he says, are not acquainted with the complication of the process of veneering in the case of articles that present any but the simplest forms; and any common-sense person reading for the first time even the brief instructions and description of the process given here for the use of amateurs, would probably feel a degree of wonder at the trouble that is taken to get over the difficulties which oppose the practice of a sham method, half the care and labour bestowed upon which would suffice to produce some really good and honest work of a high class, in perfectly good though less costly material than that generally used for veneering. In general, throughout the book, the best way of doing everything, in regard to the use of the material, is well brought out; the exception, as usual, being in the case where some form supposed by force of habit and fashion to be ornamental or artistic is to be illustrated, and then we have such things as the claw leg for a pillar-table (p. 121), or the spiral or scroll leg (p. 123); forms not only wretched in themselves as regards appearance, but such as no sensible workman in wood, if not under the influence of the demon "taste," would ever think of adopting. This is always the case, we find, in these practical books, whenever the writers travel out of the line of the practical into what they regard as the ornamental, in which they are governed, generally, by mere habit and bad precedent, without any consideration as to whether the forms portrayed really are consonant with the best way of working the material, or with the purpose for which the object is designed.

In every other respect this is an excellent and (for its object) remarkably full little treatise, which we have pleasure in recommending. Lapses of English are, we suppose, inevitable in books of this kind. We have not been looking for them; but our eye was caught (p. 60) by the heresy apparently universal among practical workmen of every grade, that "stand" is a transitive verb. "*Stand* up one of the ends in the vice," in preparation for glueing a box, and then "this end must be removed from the vice and *stood* on the bench," &c. Such vulgarisms should at least be avoided in print.

The Amateur House Carpenter: a Guide in Building, Making, and Repairing. By ELLIS A. DAVIDSON. With numerous Illustrations, drawn on Wood by the Author. Chapman & Hall. 1875.

THIS, in spite of the similarity of title, is not quite similar in scope to the above-mentioned book. It leans more towards the carpentry side of woodwork, as the other leans more towards that of joinery and cabinet-making. The usefulness of Mr. Davidson's book is chiefly as a guide, to enable boys and young men who want some healthful and useful recreation, or persons of any age thrown into a position in which they have to depend on their own resources a good deal (colonists, for instance, in only partially inhabited countries) to put together fixtures and small erections which may be wanted, and do repairs about the house, without necessarily calling in the aid of a professed joiner, if he be at hand, or feeling utterly lost without him, if he be not at hand. Books of this tendency deserve all encouragement, not only for their real usefulness in the latter case, but for their valuable tendency in the former case, in suggesting useful and sensible work "for idle hands to do," instead of the "mischief" which a certain personage is believed to be always ready to suggest for them. Regarded in this light, all the practical part of Mr. Davidson's book is well put, and, for practical purposes, sufficiently illustrated. Perhaps the volume would have served its purpose better if it had been a little smaller and more compact in form, and more condensed in matter. The author is a little too fond of making "pretty writing" out of his subjects, not always to the purpose, as people do not take up a book of this kind for light reading or recreation. When he diverges into ornamental work he is not much better than his fellows: "Baby's crib," for example (p. 162), is simply a piece of "gim-crack." Bad ornamental work is a great deal worse than none at all. With this reservation, which we cannot reconcile it to our conscience to omit, Mr. Davidson's book will be useful, more especially as he adds a chapter on "general principles of building" and one on "plans and working drawings," which extend the scope of the work to the general building operations with which all carpentry is connected.

VARIORUM.

"SPRAGUE'S Pocket Diary and Architects' and Surveyors' Memorandum Book for 1876" may be recommended. It gives room for daily engagements, and includes many useful tables and memoranda.——"The City Diary" is published as usual by Messrs. Collingridge. Each page is divided for a week.——Blackwood's 1876 Shilling Scribbling Diary is foolscap in size.

Miscellanea.

The Destruction of St. Antholin's Tower. The *Daily News*, of Dec. 25, in a leading article on the parochial charities of the City of London, says:—"The taking down of the stone tower which was the only remaining relic of the parish church of St. Antholin has raised some very justifiable protests against removing the architectural monuments of London. The church itself has been swept away, but the spire was left, and its prominent position in the new street to the Mansion House made it one of the ornaments of the City. It broke the heavy line of modern offices of which the new street consists, and, without occupying much valuable space, asserted for old London a place in the renovated City. The tower was one of Wren's best works, and its destruction not merely sweeps away a landmark, but obliterates a monument of genius. The process of removal is, however, rapidly going forward, and the corner will soon be occupied with a new shop or warehouse, which will yield a ground-rent to the Commissioners. The impossibility of doing without this rent in the notoriously impoverished condition of the Church in the most richly-endowed square mile in her whole territory is the only excuse for this act of barbarism. The City is full of ecclesiastical charities as useless as St. Antholin's tower, but not ornamental, and almost any one of them, reformed and redeemed from waste or abuse, would probably have compensated for the ground-rent lost by letting Wren's handiwork alone."

Chatham Dockyard Extension.—The excavations in progress at St. Mary's Island for the large fitting-out basin in connexion with the Chatham Dockyard Extension are well advanced, some 1,500 convicts being at work upon them daily, the work being carried on under the direction of Mr. E. A. Bernays, C.E. The basin now under construction will be the largest of the three that were ordered to be constructed, and it will cover about forty acres; the other two basins have been completed and in use some considerable time. Several new workshops and factories are to be constructed near these basins, and at the present time a party of convicts are putting up a large iron building, which will be used as a boiler shop; other buildings have already been constructed, and are filled with machinery.

A Churchwarden Imprisoned for effecting a Public Improvement.—Whatever may have been the deserts of those churchwardens of the past who, in their zeal for "repairing and beautifying," committed such irreparable havoc in the buildings of which they were the custodians, it will hardly be thought just to imprison a churchwarden of the present day simply because he has sought to improve the appearance of his churchyard. But, according to the *Norfolk News*, this has actually been done. It appears that some time ago the churchyard of St. Augustine's, Norwich, was in a disgracefully-neglected and dilapidated state, and funds were raised for its improvement, the Corporation subscribing 120*l*. While the works were in progress no objection was made on the part of the ecclesiastical authorities, but proceedings were subsequently taken against the churchwardens in the Episcopal Consistorial Court of Norwich, although the promoter of the proceedings (the Archdeacon of Norwich) admitted that a great public improvement had been effected. The case was decided adversely to the churchwardens, who were condemned to pay the costs, amounting to 21*l*. 2s. 6d. This they refused to do, and one of them (Mr. Gilbert) has been lodged in Norwich Gaol for "contumaciousness." The other warden appears to have evaded arrest by keeping "out of the way."

Dock Extension at Liverpool.—At a recent meeting of the Mersey Docks and Harbour Board, the Committee of Works recommended that the Board should proceed with the construction of a further section of the new works at the north end, authorised by the Mersey Dock (Liverpool Dock Extension Act, 1873). Mr. Hubback, in moving the confirmation of the recommendation, said as regards the hydraulic-lift dock, which is included in this section, the committee have paid special attention to this matter, and have concluded that such an appliance will greatly add to the convenience of the docks in this locality. It is designed with a view to lifting (upon a platform) clear out of the water, and within a few minutes, with perfect ease and safety, the largest class of vessels that enter the port. Messrs. Clarke & Stansfield, of Victoria-street, Westminster, are the designers of the lift-dock, which, though similar in principle to those already erected, is improved in detail by reason of suggestions and alterations submitted by the Board's own engineer, in consequence of the special features of Liverpool docks.

Proposed Stephenson Memorial Hall, Chesterfield.—About four years ago, the Chesterfield and Derbyshire Institute of Mining, Mechanical, and Civil Engineers (acting in concert with the local Mechanics' Institute) set on foot a movement for the erection of a building which should serve as a scientific and literary institute, and at the same time be an appropriate memorial of George Stephenson, to whom the town owes much of its present position and prosperity, and whose remains lie in its churchyard. Although cordially received, the proposal has for some reason or other lain in abeyance, but it has now been revived with a fair prospect of success. The estimated cost of the building is 10,000*l*., and of this sum about 5,000*l*. have already been subscribed. A site was offered for the building by the Corporation of Chesterfield, but the offer was declined, as the site was not thought to be in the best position that could be obtained; and consequently, of the 5,000*l*. subscribed, the sum of 1,500*l*. will have to be paid for the site which has been chosen.

Cottage Hospital at Forgue, Banffshire. There has just been erected in the parish of Forgue, in pursuance of the wishes of the late Mr. Morison, of Bognie, a neat cottage hospital for the benefit of patients resident in the parishes of Forgue, Ythanwells, Auchterless, and Inverkeithny. The building, which has a southerly exposure, consists of two cottages apart, connected together by a verandah 45 ft. in length, and the front elevation from cottage to cottage extends to 120 ft. The architect is Mr. Duncan, Turriff, and the contractors are Charles Ingram, mason, Huntly; James Copland, carpenter, Cobairdy; Alexander Walker, slater, Banff; John Gibson, plasterer, Turriff; and Messrs. W. & C. Duthie, plumbers, Turriff.

St. Thomas's Hospital, Northampton.—At the annual meeting of the Architectural Society for the Archdeaconries of Northampton and Oakham, held at Northampton, on the 13th ult., Sir Henry Dryden read a paper on St. Thomas's Hospital, Northampton.

The New Docks at Barrow.—Great damage has been done to the new docks now in course of construction at Barrow-in-Furness, by a slip of wall caused by the action of the recent heavy rains. The works were commenced two years ago. The entrance basin, 900 ft. long, and the lock, 600 ft. long, were first proceeded with, and were fast approaching completion. The quay wall, where the accident has happened, had a foundation of concrete, and the wall for 15 ft. above this was of the same material, the superstructure being of red sandstone and granite. The wall, 12 ft. thick, was nearly completed, only the top stones being required. The concrete as well as the superstructure has given way, and for about 400 ft. the summit of the wall has fallen back, while the base has bulged inwards, and in one place a complete breach of the wall has been made for about 40 ft. The result is that the whole of the damaged wall will have to be removed and rebuilt. The damage cannot be estimated at less than 20,000*l.* or 30,000*l.*

The Dolgelley Parliament House.—A movement has just been commenced at Dolgelley for the purchase and preservation of the ancient building known as the Parliament House of Owen Glendower, although it has been questioned whether the existing building is in truth the building where the Welsh prince convened his national assembly. It appears that of late years the inhabitants of the quaint little town have made strenuous efforts in the direction of public "improvements," though much remains to be done in the way of sanitary reform. In the course of the alterations it became evident that if the rebuilding of the houses were to progress near the central thoroughfare the structure in question must be razed to the ground. The possibility of such destruction gave rise to considerable local excitement; and protests against the contemplated demolition resulted eventually in an influential public meeting.

Alexandra Palace.—The directors' report states that a profit of 23,C24*l.* 18s. 4d. has been realised on the workings of the past six months, and it is expected that this will be greatly augmented as the Palace and its attractions become more widely known, and increased railway facilities are provided. It is hoped that ere long three more railway companies will open direct communication with the Palace, thus bringing visitors from far-outlying districts. The company also expects to increase the number of season-ticket holders, which already shows a steady advance, by selling the 260 acres of building-land adjoining the palace and park, thus creating a resident population, many of whom would doubtless avail themselves of the advantages of a season-ticket. The sale of this land, which, it is expected, will realise over 300,000*l.*, would also materially decrease the capital of the company.

St. Margaret's Church, Westminster.—A committee, consisting of the Duke of Buccleuch, Lord Hatherley, the Speaker of the House of Commons, the Dean of Westminster, Canon Conway, and several of the principal parishioners, has been formed for promoting the restoration of this church. The original church was founded by Edward the Confessor, contemporaneously with the Abbey, for the benefit of the inhabitants residing outside the monastic buildings. The present building was erected in the reign of Edward I., and was considerably altered in that of Edward IV. The sum required for the restoration is very considerable, and it is stated that the general arrangements will be under the direction of Sir Gilbert Scott.

Presentation to a Builder's Manager.—Mr. Thomas Bakewell, who has until recently managed the business of the late Mr. E. Dusautoy, builder and contractor, of Derby, has been presented with a clock by the *employés* of the firm. The clock is of black marble relieved by bronze ornaments, and surmounted with a bronze eagle with expanded wings, and bears the following inscription:—"Presented to Mr. Thomas Bakewell, as a mark of respect, by the *employés* of the late E. Dusautoy, Esq., upon the occasion of his leaving.—Derby, Nov., 1875."

The Spire of the Manchester New Town-hall.—On the 4th ult. the top-stone was placed upon the spire of the new Town-hall, Manchester, by Mr. Alderman Heywood, the chairman of the New Town-hall Sub-committee. The spire is 288 ft. high.

Greek Architects.—The epitaph by Dean Swift upon Sir John Vanbrugh is well known, namely:—

"Lie heavy on him, earth, for he
Laid many a heavy load on thee."

Lord Neaves, in his recent edition of "The Greek Anthology," observes, "This is nearly the counterpart of the following Greek epigram," viz.:—

"Hail, Mother Earth! lie light on him
Whose tombstone here we see:
Œ igenes his form was slim,
And light his weight on thee."

In an epigram by Ammianus, the following translation has been made by Merivale, viz.:—

"Light lie the earth,
Nearchus, on thy clay,—
That so the dogs may easier
Find their prey."

St. Mary's Mission Hall, Bury St. Edmunds.—The newly-erected mission-hall in Raingate-street, Bury, has been opened. The building has a front of red brick, with white dressings, and consists, on the ground-floor, of a hall, 60 ft. by 30 ft., with entrance-lobby, kitchen, and offices, and at one end there is a platform, 11 ft. by 4 ft. Above the hall is a school-room, with class-room attached, of corresponding dimensions; this is reached by two flights of stairs, one for boys, and one for girls. The roofs are of open wood-work. The clerk of the works was Mr. L. Jackaman; and the builder, Mr. Firman, both of Bury St. Edmunds.

The Swiss Gardens, New Shoreham.—A new entrance-lodge in the Swiss style has just been completed at these gardens. It is built wholly of wood, and at the north and south ends are lofty towers. The lodge has been built by Mr. Reid, of Brighton, from the designs and under the superintendence of Mr. Arthur Loader, architect. A series of improvements within the gardens is about to be commenced, the first undertaken being the extension of the ball-room, and the erection of a new front to it (of similar character to the new entrance-lodge), also designed by Mr. Arthur Loader.

New Chapel at Greenwich Union Workhouse.—The memorial stone of a new chapel, in the grounds of Greenwich workhouse, has been laid. The building is intended to seat 400 persons, according to the plans of Mr. Wallen, the Board's architect, the builder being Mr. Hart, of Dover-street, Borough, who is also the contractor for the new infirmary, which was commenced about three months ago, and is expected to be completed in March. The style of architecture is Gothic, with yellow brick, red bands, and Bath stone facings. The contract was taken for 2,250*l.*

The Royal Aquarium.—We are glad to hear that Mr. W. W. Robertson has purchased the Cruikshank Art Collection on the part of the Royal Aquarium and Summer and Winter Garden Society. The collection will be arranged under the personal superintendence of Mr. Cruikshank himself, and will be exhibited in the Art Galleries of the Society at the close of the first annual fine-art exhibition. About 1,500 paintings have been accepted for exhibition. Mr. Redgrave, R.A., Mr. Millais, R.A., Mr. Weekes, R.A., and Mr. Marks, A.R.A., are the "Hanging Committee."

Archæological Discovery in Wigtownshire.—New outhouses have recently been erected at the farmstead of Ervie, Kirkcolm, and the farmer and his men were engaged carting clay away from the vicinity of them, when one of the men came on what appeared to be a small trap-door under some flat stones. It was found to be the lid or cover of a "cist" or sepulchre, hewn out of the solid rock. The oaken cover was fitted neatly into a sort of groove cut out of the rock.

The Rating of Timber Ponds.—At the Jarrow Petty Sessions, on the 14th ult., Mr. John Carr, of the St. Lawrence Saw Mills, Newcastle, was summoned for non-payment of 4*l.* 16s. 3d., being the general district rate. The defendant had refused to pay rates, as he contended that the place where his timber lay was covered with water. For the plaintiffs it was pointed out that the timber-yard was only occasionally filled with water, according as the tide rose and went back. The Bench made an order for the amount claimed.

Society of Engineers.—On the 21st ult. the annual dinner in connexion with this society was held at the City Terminus Hotel, Cannon-street, under the presidency of Mr. J. H. Adams, C.E., of the North London Railway Company. About seventy gentlemen sat down to dinner.

"The Unmistakable True North Compass."—Most people know that the compasses usually sold do not point to the true North or South Pole of the earth, or agree with the positions represented upon maps, but are apt to disregard it, though the difference between the two is considerable, and may often be the cause of tourists losing their way. Symons's Patent True North Compass (sold by Mr. Casella) shows the true North, and so unmistakably as to render any description unnecessary. It is corrected for use in the United Kingdom, but can be adapted to any specified locality in any part of the world.

Charing Cross Railway Station.—At a meeting of the Metropolitan Board of Works on the 22nd ult., it was resolved to petition against the South Eastern Railway Company's Bill for taking some of the land in the new street from Charing-cross to the Victoria Embankment. It was stated that the plan of the railway company for the enlargement of their Charing-cross station would materially interfere with the new approach to the Embankment.

International Competition at Antwerp. Baron Solvyns, the Belgian Minister resident in England, has forwarded to the Institute of British Architects particulars of a competition for two orphan asylums and an almshouse to be erected at Antwerp. Designs are to be sent in before the 1st of February, 1876. A few plans of the site and copies of the conditions have been received at the Institute.

Proposed New Baths for Rochester.—At their last meeting, the trustees of Watts's Charity arranged for the purchase, subject to the approval of the Charity Commissioners, of a vacant piece of land in Eastgate, on which to erect the proposed swimming-baths and wash-houses in the city. The proposed site is one of the most central which could be chosen for the purpose.

New Masonic Hall at Morpeth.—On the 13th ult. a new public hall was opened at Morpeth. The building contains two public halls, each 66 ft. by 29 ft., that on the first floor having a gallery. There are also two dwelling-houses of two rooms each, and a lodge-room, 32 ft. by 18 ft., with an ante-room attached. The building has been erected by the Masonic Hall Company (Limited).

A Cottage Hospital for Andover.—Arrangements are in progress for the erection of a cottage hospital at Andover, the greater portion of the required funds having been subscribed. At a public meeting recently held in furtherance of the project, the plans of the proposed hospital were explained by Mr. White, the architect, and were approved, subject to some slight alteration.

A Pig's Bedroom.—At the petty sessions of Nenagh, on the 4th ult., in the course of the evidence given in an abusive language case, it appeared that both litigants, with their families, occupied the same house, and the quarrel between them had arisen from the disturbance of the sleep of one of the families by the snorting of a pig which slept under the bed occupied by the other!

The Excavations at Olympia.—A telegram has been received at Berlin, from Pyrgos, conveying the intelligence that the excavations at Olympia have been rewarded by the discovery of a valuable relic of Grecian art, the first object found on the spot consisting of a marble statue of Nike, a product, as appears from the well-preserved inscription, of the chisel of Pæonius, and presented as an offering from the Messenians of Naupactus.

New Baths for Attercliffe.—New baths are about to be erected at Attercliffe, Sheffield, at an estimated cost of 8,500*l.*, from plans prepared by Mr. Stovin, the assistant borough surveyor. The style of architecture will be Italian, and the accommodation to be provided comprises a first-class swimming-bath, 36 ft. long by 20 ft. wide; a second-class bath, 63 ft. by 34 ft.; and a large number of private baths of various kinds.

Proposed Public Hall at Dunfermline.—A company has been formed at Dunfermline for the erection of a new public hall. It is proposed to have two halls,—one to accommodate 1,500, the other to hold 400,—in all 1,900. The estimated cost of the building is 6,000*l.* The hall is proposed to be erected in St. Margaret-street, on a site which will give three frontages.